Colour Television — Chassis

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AA

Service
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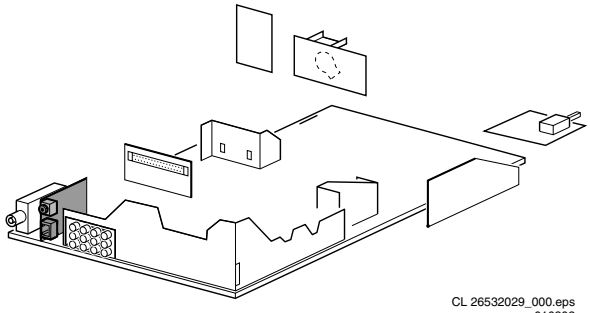

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Service Manual

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PHILIPS

1. Technical Specifications, Connections and Chassis Overview

Index:

1. Technical Specifications.
2. Connections.
3. Chassis Overview.

Note:

- Described specifications are valid for the *whole* product range (see Product Survey for *specific* models).
- Figures can deviate slightly from the actual situation, due to different set executions.

1.1 Technical Specifications

1.1.1 Reception

Tuning system	:	PLL
Colour systems	:	NTSC 3.58, 4.43
	:	PAL B/G, B/H, D/K, I
	:	SECAM B/G, D/K, K1
Sound systems	:	FM-stereo
	:	2CS (B/G, China, Korea)
	:	BTSC DBX
	:	NICAM B/G, D, D/K, I
	:	BI-NICAM B/G, D, D/K, I
A/V connections	:	NTSC 3.58, 4.43
	:	PAL 60
Channel selections	:	100 or 125 channels
	:	UVSH or full cable
Aerial input	:	75 Ω, IEC- or F-type

1.1.2 Miscellaneous

Audio output	:	2 x 5 W (with SAP)
	:	2 x 5 W + 10 W (subwoofer)
	:	2 x 5 W + 10 W + 2 x 3 W
Mains voltage	:	90 - 276 V or 150 - 276 V
Mains frequency	:	50 or 60 Hz
Ambient temperature	:	+ 5 to + 45 deg. C
Maximum humidity	:	90 %
Standby Power consumption	:	< 3 W

1.2 Connections

1.2.1 Front (or Side) Connections and Front (or Top) Control

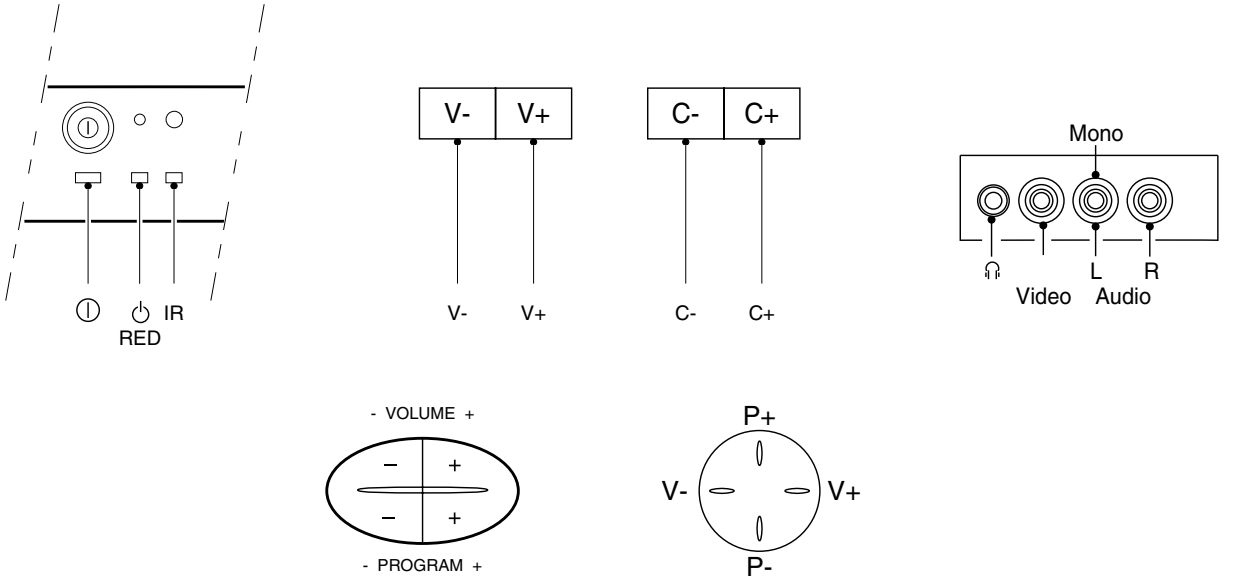


Figure 1-1 Front and Top Controls

Audio / Video In

1 - Video	CVBS (1 Vpp / 75 Ω)	
2 - Audio	L (0.2 Vrms / 10 kΩ)	
3 - Audio	R (0.2 Vrms / 10 kΩ)	
4 - Headphone (3.5 mm)	8 - 600 Ω / 4 mW	

1.2.2 Rear Connections

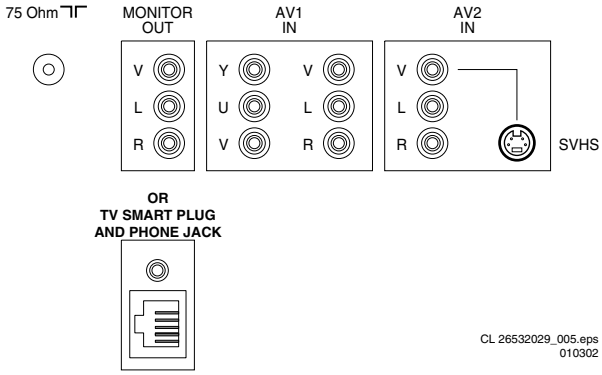


Figure 1-2 Rear Connections

Monitor Out

1 - Video	CVBS (1 Vpp / 75 Ω)	
2 - Audio	L (0.5 Vrms / 1 kΩ)	
3 - Audio	R (0.5 Vrms / 1 kΩ)	

YUV In (if present)

1 - Y	0.7 Vpp / 75 Ω	
2 - U	0.7 Vpp / 75 Ω	
3 - V	0.7 Vpp / 75 Ω	

AV1 In

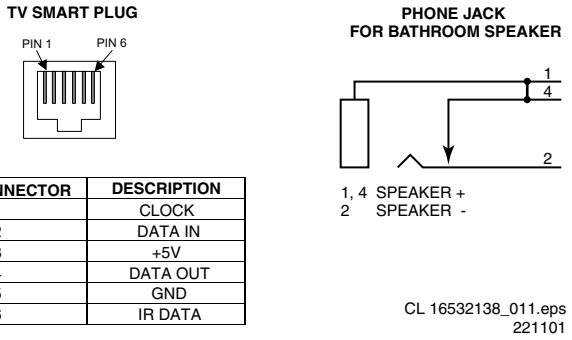
4 - Video	CVBS (1 Vpp / 75 Ω)	
5 - Audio	L (0.5 Vrms / 10 kΩ)	
6 - Audio	R (0.5 Vrms / 10 kΩ)	

AV2 In

1 - Video	CVBS (1 Vpp / 75 Ω)	
2 - Audio	L (0.5 Vrms / 10 kΩ)	
3 - Audio	R (0.5 Vrms / 10 kΩ)	

AV2 In (SVHS)

1 -	gnd	
2 -	gnd	
3 - Y	1 Vpp / 75 Ω	
4 - C	0.3 Vpp / 75 Ω	



RJ11 CONNECTOR	DESCRIPTION
1	CLOCK
2	DATA IN
3	+5V
4	DATA OUT
5	GND
6	IR DATA

Figure 1-3 Smart Plug / Phone Jack

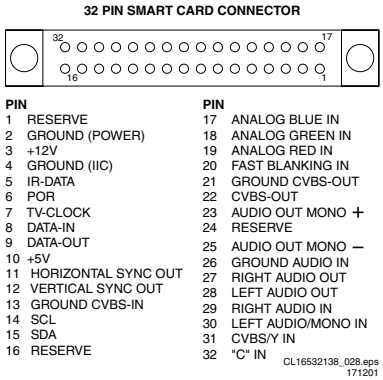


Figure 1-4 Smart Card Connector (32 Pins)

1.3 Chassis Overview

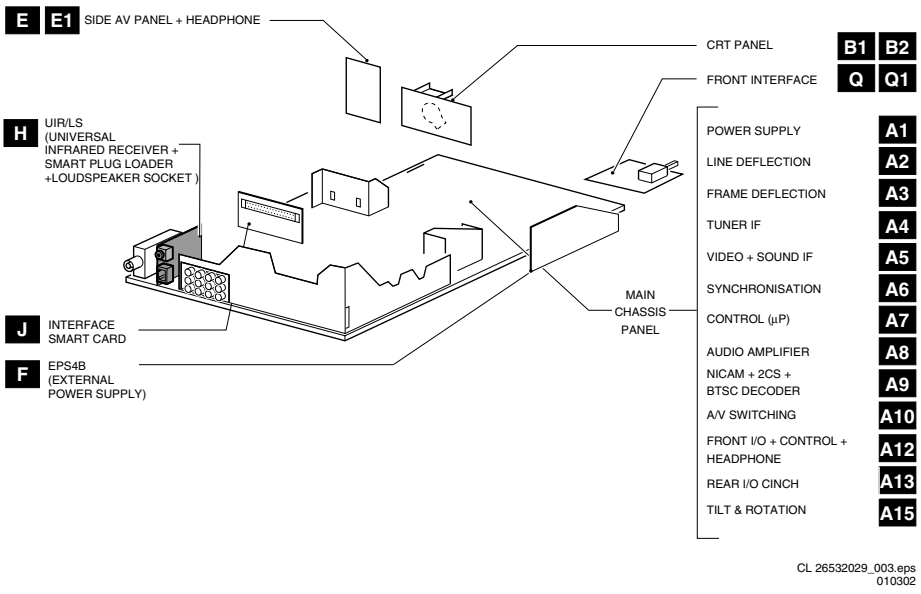

E E1 SIDE AV PANEL + HEADPHONE
H UIR/LS (UNIVERSAL INFRARED RECEIVER + SMART PLUG LOADER +LOUDSPEAKER SOCKET)
J INTERFACE SMART CARD
F EPS4B (EXTERNAL POWER SUPPLY)
MAIN CHASSIS PANEL
CRT PANEL B1 B2
FRONT INTERFACE Q Q1
POWER SUPPLY A1
LINE DEFLECTION A2
FRAME DEFLECTION A3
TUNER IF A4
VIDEO + SOUND IF A5
SYNCHRONISATION A6
CONTROL (µP) A7
AUDIO AMPLIFIER A8
NICAM + 2CS + BTSC DECODER A9
A/V SWITCHING A10
FRONT I/O + CONTROL + HEADPHONE A12
REAR I/O CINCH A13
TILT & ROTATION A15
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Figure 1-5 Chassis Overview

2. Safety & Maintenance Instructions, Warnings, and Notes

2.1 Safety Instructions For Repairs

Safety regulations require that during a repair:
- Due to the 'hot' parts of this chassis, the set must be connected to the AC power via an isolation transformer.
- Safety components, indicated by the symbol ▲, should be replaced by components identical to the original ones.
- When replacing the CRT, safety goggles must be worn.

Safety regulations require that after a repair, the set must be returned in its original condition. Pay particular attention to the following points:
- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current is flowing, in particular:
  - all pins of the line output transformer (LOT)
  - fly-back capacitor(s)
  - S-correction capacitor(s)
  - line output transistor
  - pins of the connector with wires to the deflection coil
  - other components through which the deflection current flows.

Note: This re-soldering is advised to prevent bad connections due to metal fatigue in solder connections and is therefore only necessary for television sets more than two years old.
- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the AC power cord for external damage.
- Check the strain relief of the AC power cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the AC plug and the secondary side (only for sets that have an isolated power supply). Do this as follows:
  1. Unplug the AC power cord and connect a wire between the two pins of the AC plug.
  2. Turn on the main power switch (keep the AC power cord unplugged!).
  3. Measure the resistance value between the pins of the AC plug and the metal shielding of the tuner or the aerial connection of the set. The reading should be between 4.5 MΩ and 12 MΩ.
  4. Switch the TV OFF and remove the wire between the two pins of the AC plug.
- Check the cabinet for defects, to prevent the possibility of the customer touching any internal parts.

2.2 Maintenance Instructions

It is recommended to have a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:
- When the set is used under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When the set is used in an environment with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:
  1. Perform the 'general repair instruction' noted above.
  2. Clean the power supply and deflection circuitry on the chassis.
  3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in Fig. 2-1, to discharge the picture tube. Use a high voltage probe and a multi-meter (position VDC). Discharge until the meter reading is 0 V (after approx. 30 s).

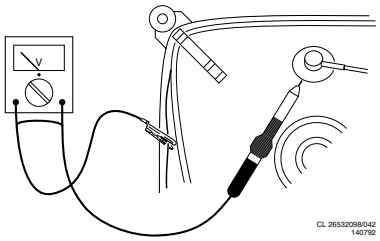


Figure 2-1

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD) ⚠. Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this potential. Available ESD protection equipment:
  - Complete kit ESD3 (small tablemat, wristband, connection box, extension cable, and ground cable) 4822 310 10671.
  - Wristband tester 4822 344 13999.
- Together with the deflection unit and any multi-pole unit, flat square picture tubes form an integrated unit. The deflection and the multi-pole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
- Be careful during measurements in the high voltage section and on the picture tube.
- Never replace modules or other components while the unit is switched ON.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.4 Notes

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the area of circuitry being tested.
- The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a color bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz (PAL) or 61.25 MHz (NTSC, channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in standby (⏲). These values are indicated by means of the appropriate symbols.
- The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
- The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

Safety Information and Useful Tips

Safety Information

- Disconnect mains plug when :
– the red light below the TV screen is flashing continuously.
– a bright white line is displayed across the screen.
– cleaning the TV screen. Never use abrasive cleaning agents. Use a slight damp chamois leather or soft cloth.
– there is a lightning storm.
– the set is left unattended for a prolonged period of time.
- No naked flame sources, such as lighted candles, should be placed on top of the TV or in the vicinity.
- Do not place your TV set under direct sunlight or heat.
- Leave at least 5 cm around each side of TV set for ventilation to avoid over-heating.
- Avoid placing your set (e.g. near the window) where it is likely to be exposed to rain or water.
- No objects filled with liquids should be placed on top the TV so as to avoid dripping or splashing of liquids on the set.

Useful Tips

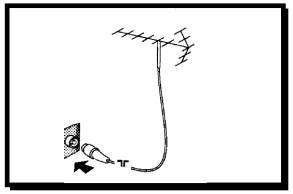
- Do not leave your set on standby mode for a prolonged period of time. Switch off set to allow it to be demagnetised. A demagnetised set supports good picture quality.
- Do not shift or move the set around when it is switched on. Uneveness in colour in some parts of the screen may occur.
- Never attempt to repair a defective TV yourself. Always consult a skilled service personnel.

Before Calling Service

Below is a list of frequently occurred symptoms. Before you call for service, make these simple checks. Some of these symptoms can easily be rectified if you know what to do.

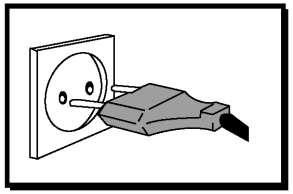
Symptom	What you should do
Colour patch (uneveness)	• Switch off the TV by the mains power button. Wait for 20 minutes before switching on again. • Check the TV is not placed too near speakers or magnetic objects.
No power	• Check the TV's AC power cord is plugged into the mains socket. If there is still no power, disconnect plug. Wait for 60 seconds and re-insert plug. Switch on the TV again.
No picture	• Check the antenna connection at the rear of the TV. • Possible TV station problem. Try another channel.
Good picture but no sound	• Try increasing the volume. • Check that the sound is not muted. If it is muted, press the Mute button on the remote control to restore sound.
Good sound but poor colour or no picture	• Try increasing the contrast and brightness setting.
Snowish picture and noise	• Check antenna connection at the rear of the TV.
Horizontal dotted lines	• Possible electrical interference e.g. hairdryer, vacuum cleaner, etc. Switch off appliances.
Double images or "Ghost" images	• Possible poor positioning of antenna. Using a highly directional antenna may improve reception.
TV not responding to remote control handset lens on the TV.	• Check life span of batteries of remote control handset. • Aim remote control handset directly at remote control sensor

HOOKING UP YOUR TV (BASIC CONNECTION)



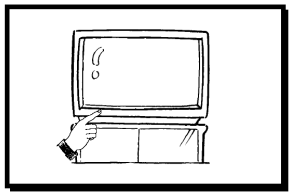
ANTENNA CONNECTION

- Connect the aerial plug to the antenna socket on the backcover.



MAINS CONNECTION

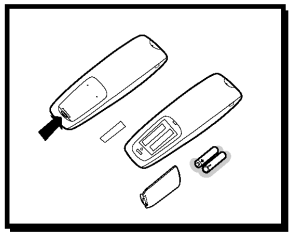
- For correct mains voltage, refer to type sticker at the rear of the TV set
- Consult your dealer if mains supply is different.



SWITCHING ON THE SET

- Press the main power button to switch on/off the TV.
  If the set is on standby (indicator is red), press the Power button on the remote control to switch on the set.

USE/CARE OF REMOTE CONTROL



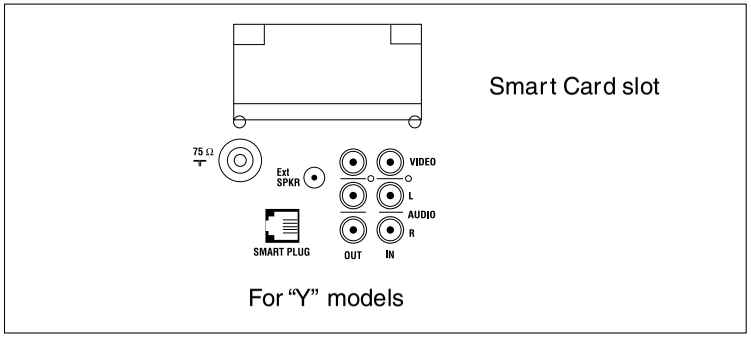
To load the supplied batteries into the remote control :

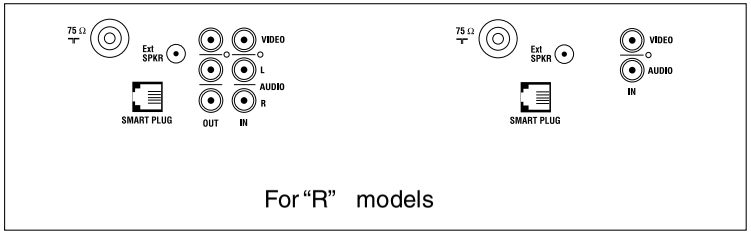
– Remove the battery compartment lid at the back of the remote control.
– Insert the correct type of batteries into the compartment.
– Ensure the (+) and (–) ends of the batteries are placed in the right position.
– Reattach the battery compartment lid.

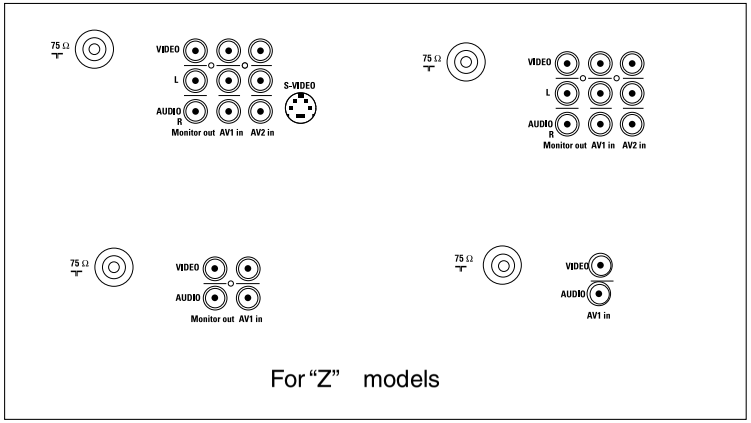
Note
Always remove the batteries from the remote control handset if handset is not used for a long period. This can help prevent damage to handset from possible battery leakage.

BACK CONNECTORS

*WARNING - RISK OF ELECTRIC SHOCK. DO NOT REMOVE THIS COVER.
- DO NOT CONNECT TELEPHONE CABLE TO RJ11CONNECTOR.

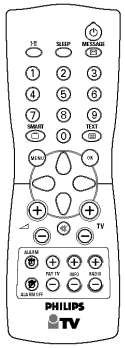






Remote Controls

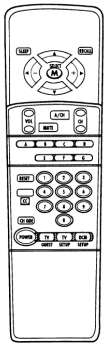
Three types of remote controls could be used for setup purpose:



RC2882/01

RCLA014

RCLA015



T374AH
(RG4172BK)
(optional)

For the purpose of explanation, RC2882/01, RCLA014 and RCLA015 is used. Remote control T374AH is optional and can be purchased separately. Refer to its accompanying guide "T374AH Remote Control Instructions" for details of its operation.

Select Setup menu

With remote control RC2882/01, RCLA014 or RCLA015

(only when SECURITY in the TV SETUP menu is set to STANDARD).

To select TV Setup menu:

1. Select a channel number.
2. Key in 3 1 9 7 5 3.
3. Press 🔇.

The above sequence should be done within 20 seconds.
TV SETUP menu appears.

With remote control T374AH (RG4172BK)

(only in TV Commercial mode)

To check TV's mode:

1. Press TV SETUP key.
2. Press RECALL key.

To select Commercial mode, if TV is in Consumer mode (or to select Consumer mode, if TV is in Commercial mode):

1. Press TV SETUP key.
2. Press 0 2 4 9 9 5.
3. Press M key.
   Menu appears.
4. Press + or − key to select Commercial mode.
5. Highlight **STORE** and press the ▶ key to store changes.
   TV will go into standby mode.

TV SETUP MAIN MENU

Below shows the structure of the menu items

TV SETUP	
* LANGUAGE	ENGLISH
NO. OF CHANNELS	▶
* INSTALLATION	▶
* CLOCK SETUP	▶
* BRIGHTNESS	30
* COLOUR	33
* CONTRAST	49
* SHARPNESS	58
* TINT	49
FORCED MONO	NO
BALANCE	0
* TREBLE	58
* BASS	49
AVL	NO
VOLUME FIXED	NO
VOLUME BAR	YES
MIN VOLUME	0
MAX VOLUME	33
SWITCH ON VOLUME	33
SWITCH ON CHANNEL	TV 2
POWER ON	STANDARD
STEP TUNING	NO
DIGIT TIMEOUT	5.0SEC
CHANNEL DISPLAY	ALL
KEYBOARD LOCK	NO
FREE PROTECTED	NO
ESP	10HR
INTERFACE	NO
* AUDIO/VIDEO MUTE	NO
WELCOME MESSAGE	▶
CHANNEL GUIDE	NO
REMINDER	NO
SECURITY	LOW

*Note:*denotes item appears in both the Commercial and Consumer mode.*

Only 8 items will be displayed at one time.

1) To see more items, press the (v) key on the remote control. To alter any item on the menu, highlight it with the (v)key and execute with the (<) or (>) key.
2) To highlight any item in a menu, press either the (^) or (v)key to move the coloured bar until it rest on the item.
3) To select options or to execute an item in the menu, press the (<) or (>) key.
4) To exit, press the MENU key.

TV SETUP SUB-MENUS

LANGUAGE

When you first enter the TV SETUP menu, LANGUAGE is highlighted. You may select other languages available with the (<) or (>) key.

NO. OF CHANNELS (valid if RC2882/01 is supplied)

Show the number of channels under each category type. Enter the TV SETUP menu and highlight NO.OF CHANNELS.

TV SETUP	
LANGUAGE	ENGLISH
NO. OF CHANNELS	▶
TV INSTALLATION	▶
CLOCK INSTALLATION	▶
BRIGHTNESS	30
COLOUR	33
CONTRAST	49
SHARPNESS	58

Note: Use the (<) or (>) key to select its sub menu.

NO. OF CHANNELS	
TV	35
PAYTV	5
INFO	5
RADIO	5
STORE	▶

Highlight the item you wish to change. Edit with the digit keys. To store changes in the memory, highlight STORE and confirm with the (>) key. The total number of channels cannot exceed 125. After storing is completed, TV will go into standby mode.

TV INSTALLATION (for countries other than Philippines)

Highlight INSTALLATION in the TV SETUP menu and enter its sub menu with the (<) or (>) key. Installation menu via local control is not available in Consumer/ Commercial modes.

INSTALLATION	
+ INPUT	FRONT END
COLOUR STANDARD	AUTO*
SOUND STANDARD	AUTO*
AUTO STORE	▶
MANUAL SEARCH	175 MHZ ▶
CHANNEL	TV 1
STORE	▶
FINE TUNE	
PROTECTION	NO
LABEL	▶
VIDEO BLANK	NO
AUDIO BLANK	NO

Note:
+ only for commercial mode.
** TV system dependant*

TV INSTALLATION MENU

INPUT

This menu item selects the input source to be assigned per channel. The selectable sources are FRONT END, AV1, AV2, AV3 or S-VIDEO (dependant on model). To select press the (<) or (>) key.

COLOUR STANDARD/SOUND STANDARD (not available for single system TV)

Selects the colour and sound system of transmission.

AUTO STORE

When this is activated, the TV will start at the lowest valid frequency to search for a signal. Highlight AUTO STORE and press the (>) key to start. The word SEARCHING is displayed indicating that the process is in progress. When a valid station is found, the next available channel number is assigned to it. The word will disappear once the process is completed.

MANUAL SEARCH

This item could be used if you wish to search for signal station by station or if you wish to key in the frequency directly with the digit keys on the remote control. Highlight MANUAL SEARCH and press the (>) key to start searching. Once a station is found, the TV will stop searching for you to proceed to the next item.

CHANNEL

Press the (<) or (>) key to select the type of channel:- TV, PAYTV, INFO or RADIO. Then key in the channel number with the digit keys.

STORE

Press the (<) or (>) key to store any changes you have done.
Note: Each change in a channel needs to be stored individually.

FINE TUNE

Press the (<) or (>) key to fine tune the displayed frequency.

PROTECTION

Used to lock each channel individually. to lock, select YES. In normal operation, if user tries to access this channel, the picture and sound are muted. Teletext cannot be activated and the "LOCKED" message will be displayed for 3 seconds.
Note: To unlock protection for all channels at one time, go to FREE PROTECTED in TV SETUP menu and press the (>) key to execute.

LABEL

Input a maximum of 8 characters for the channel's label. Press the (>) key to start the first character input or to go to the next character and the (<) key to go to previous character. To input characters, press the (^) or (v) key to select from the list:- A to Z, 0 to 9, , , –, ., /, :, =, ?, ;, <, >, @ or space. To edit, go into the character's space and re-input. To exit, press the MENU key.

VIDEO BLANK

To blank out picture of the channel, select YES.

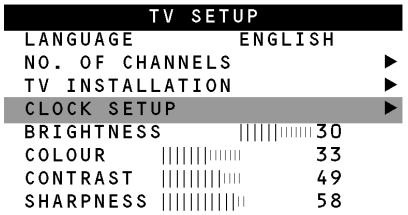
AUDIO BLANK

To switch off the sound of the channel, select YES.

TV SETUP SUB-MENUS(CON'TD)

CLOCK SETUP

To set time for display on the top right hand corner. Highlight CLOCK SETUP.



Press the (>) key to enter clock setup menu.
Use digit keys to key in desired time, starting from hour then minutes. For single digit, key in 0 follow by the digit.
To display time, highlight DISPLAY and select YES.

Alternatively, if there are channels broadcasting teletext, you could download the teletext time to your clock. In this way the displayed time will follow that of Teletext transmission.
Highlight TELETEXT TIME DOWNLOAD and select ON.

Highlight DOWNLOAD CHANNEL and select a teletext transmission channel number with the digit keys. If there is a difference in the time zone from the teletext time, highlight TIME OFFSET and using the (<) or (>) key enter the difference in time. To display the time, highlight DISPLAY and select YES. To exit, press the MENU key.
Note: The downloaded time will only take effect the next time you switched on the TV.

TV SETUP SUB-MENUS...CON'TD

BRIGHTNESS/COLOUR/CONTRAST/SHARPNESS/TINT

Enter the TV SETUP menu and highlight accordingly. Preset the TV by adjusting the brightness, colour, contrast, sharpness or tint (applicable for NTSC signal only) of the picture. All these 5 items are also accessible to users via the MENU key for personal settings.

FORCED MONO (available in stereo sets only)

Switch this on to force stereo mode to mono.

BALANCE (for stereo signal)

Balances the sound output from the TV's speakers.

TREBLE/BASS(for stereo signal)

Adjust the treble or bass of sound output.

AVL (AUTO VOLUME LEVELLER)

This feature if switched on, will automatically adjust any sudden changes in the TV's volume to a preset level.

VOLUME FIXED

Sets a fixed volume level everytime TV is switched on. The selection are:

a) NO – volume level set in SWITCH ON VOLUME in the TV Setup menu.
b) YES – volume remain fixed at the SWITCH ON VOLUME level and cannot be adjusted.

VOLUME BAR

To display volume bar when adjusting volume, select YES. To hide bar, select NO.

MIN VOLUME

Sets the limit for the minimum volume of the TV. Use the (<) or (>)key to adjust.

MAX VOLUME

Sets the limit for the maximum volume of the TV. Use the (<) or (>) key to adjust.

SWITCH ON VOLUME

Sets the TV's switch on volume. Use the (<) or (>) key to adjust.

SWITCH ON CHANNEL

Sets the TV's switch on channel. Use the (<) or (>) key to select the type of channel. Key in the channel number with the digit keys. If STANDARD is selected, upon switching on, the TV will select the last viewed channel.

POWER ON

Select STANDARD, STANDBY or FORCED. If FORCED is selected, each time TV is switched on via the mains, if it is on standby at last status, it will be switched on automatically. However, if STANDARD is selected, TV will remain as last status.
Note: Standby key will not work when FORCED is selected.

STEP TUNING

For calling up or changing channels. When this feature is switched YES, the TV will respond immediately to the change of channel upon keying in the first digit. If this feature is switched NO, one has to either wait for a few seconds after keying in the first digit or complete keying in 2 digits before TV changes channel.
Note: When an external set-top box is connected to the RJ11 port for IR link, choose either YES/NO for optimum channel switching performance.

DIGITAL TIMEOUT

Selects the digit entry timeout period via digit key entry from 1.0 SEC to 9.9 SEC. This allows 0the response time between the 1st digit entry and the 2nd digit entry to be adjusted when 2-digit entry is needed.

CHANNEL DISPLAY

Selects the ways of displaying the information for a channel. The options are: ALL (display the number and label of a channel), NONE (do not display any information), NUMBER (display only the number of a channel) and LABEL (display only the label of a channel).

KEYBOARD LOCK

To lock TV control keys, select YES, To unlock, select NO.

FREE PROTECTED

Remove PROTECTION features for all channels set under TV SETUP menu. All channels are not protected when select **YES**.

ESP (ENERGY SAVING PROGRAMMABLE)

This feature selects a time when the TV will automatically turn off. The TV must remain on continuously during the period of time you select. If the power is switched off, the ESP timer will be re-initialised. Highlight ESP, then key in the required time with the digit keys. Select 0 if you do not wish to use this feature. if sleeptimer is selected, it would have priority over ESP time.

INTERFACE

Enables the communication of the TV with the DCM when select YES. This is specifically applicable to the Interactive System TV, providing the interactivity feature between a DCM card of the Service Provider and the dedicated System TV.

AUDIO/VIDEO MUTE

To blank the screen when no signal is received. Select NO (no blanking), BLACK (blank the screen black) or BLUE (blank the screen blue).

WELCOME MESSAGE

This item is used to create, edit or delete a welcoming message. You can input up to 2 lines, with a maximum of 17 characters (including of space) per line. Highlight MESSAGE in the TV SETUP menu and enter its sub menu.
Note: During creating, editing or deleting a message, you may wish to move from LINE 1 to LINE 2 or vice versa. Press the key (MENU) to exit from the present line. Highlight the new line and proceed.

TO CREATE MESSAGE WITH LINE 1:

Highlight LINE 1 with the (∨) key. Press the (>) key to begin. The cursor will appear in the first character position. To input characters, press the (∧) or (∨) key to select from the list:- A to Z, 0 to 9, , , –, •, /, :, =, ?, ;, <, >, @ or space. Press the (>) key to go to the next character position or the (<) key to go to the previous character position.

TO EXIT LINE 1:

Press the (MENU) key.

TO CREATE MESSAGE WITH LINE 2:

Highlight LINE 2 with the (∨) key. Press the (>) key to begin. The cursor will appear in the first character position. To input characters, press the (∧) or (∨) key to select from the list:- A to Z, 0 to 9, , , –, •, /, :, =, ?, ;, <, >, @ or space. Press the (>) key to go to the next character position or the (<) key to go to the previous character position.

TO EXIT LINE 2:

Press the (MENU) key.

TO EDIT MESSAGE:

Highlight the message line that you wish to delete. Press the (>) key to begin. Move the cursor to the character position that you wish to edit. Press the (∧) or (∨) key to select a new character from the list. Exit with the (MENU) key after you have finished.

TO DELETE MESSAGE:

Highlight CLEAR and press the (<) or (>) key.

TO SWITCH ON/OFF MESSAGE:

Highlight DISPLAY and select YES to display message the next time the TV is switched on or NO to not display message.

TO EXIT FROM MESSAGE MENU:

Press the (MENU) key.

CHANNEL GUIDE

Select YES to see list of channel that has been programmed. For users to see the list, press the (MENU) key to enter user's menu. Highlight CHANNEL GUIDE and press the (<) or (>) key to enter it. Press the (∧) or (∨) key to select a channel. To enter the channel, press the (<) or (>) key.

REMINDER

Select YES if a permanent display of the channel number and label on the top of the screen is desired.

SECURITY

Select HIGH and only remote control T374AH can be used to enter TV Setup menu.

OTHER FEATURES

LOW BATTERY CHECK (valid for TV using RC2882/01 only)

Press the OK key for approximately 5 seconds. The following appears:

```
SERVICE

1     REMOTE BATTERY   OK
```

If battery is low, the word **LOW** will appear in place of **OK**.
It is an indication that you need to replace the batteries in the remote control.

MESSAGE (valid for TV using RC2882/01 only)

If there is a message from the service provider, press the key to retrieve message.

TELETEXT (valid for TV using RC2882/01 or RCLA014 only)

To enter Teletext mode, press the key.

Function	Keys	
	RC2882/01	RCLA014
Page up	TV or	CH or
Page down	TV or	CH or
Select a page	Digit	Digit
Reveal a solution	– –	
Enlarge page	– –	
Hold page	– –	
Interrupt teletext	– –	
Direct access to a subject	– –	

Personal Notes:

4. Mechanical Instructions

Index:

1. Rear Cover Removal
2. Service Position Main Panel
3. Side I/O Panel Removal
4. Rear Cover Mounting

Note:
Figures can deviate slightly from the actual situation, due to different set executions.

4.1 Rear Cover Removal

1. Remove all fixation screws of the rear cover.
2. Now pull the rear cover backward to remove it.

4.2 Service Position Main Panel

There are two configurations. With and without panel bracket. Both have a different service position:

Main panel **without** bracket.

1. Disconnect the strain relief of the AC power cord.
2. Remove the main panel, by pushing the two center clips outward [1]. At the same time, pull the panel away from the CRT [2].
3. Disconnect the degaussing coil by removing the cable from (red) connector 0201.
4. Turn the panel 90 degrees counter clockwise [3].
5. Flip the panel 90 degrees [4], with the components towards the CRT.
6. Turn the panel with the rear I/O towards the CRT [5].
7. Slide the metal heatsink (near the mains transformer 5520) underneath the right chassis bracket, so the panel is secured [6].

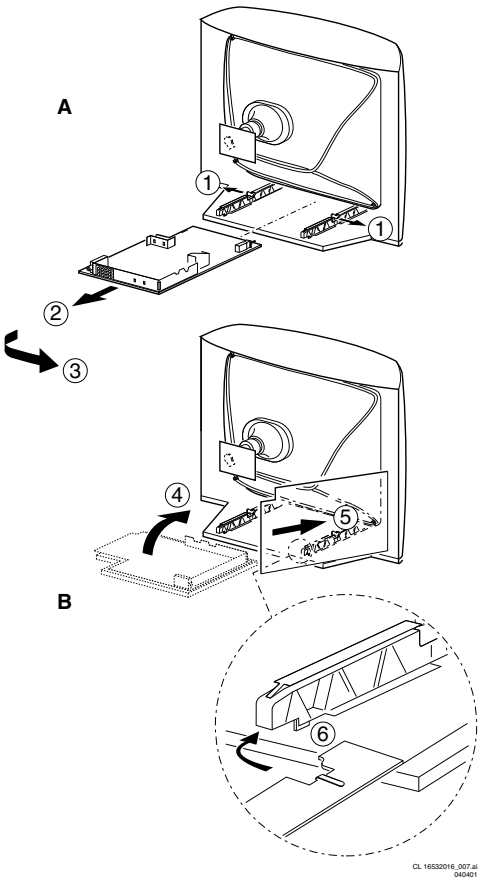


Figure 4-1

Main panel **with** bracket.

1. Disconnect the strain relief of the AC power cord.
2. Disconnect the degaussing coil by removing the cable from (red) connector 0201 [1].
3. Remove the panel bracket from the bottom tray, by pulling it backward [2].
4. Turn the chassis tray 90 degrees counter clockwise.
5. Move the panel somewhat to the left and flip it 90 degrees [3], with the components towards the CRT.
6. Turn the panel with the rear I/O towards the CRT.
7. Place the hook of the tray in the fixation hole of the cabinet bottom [4] and secure it.

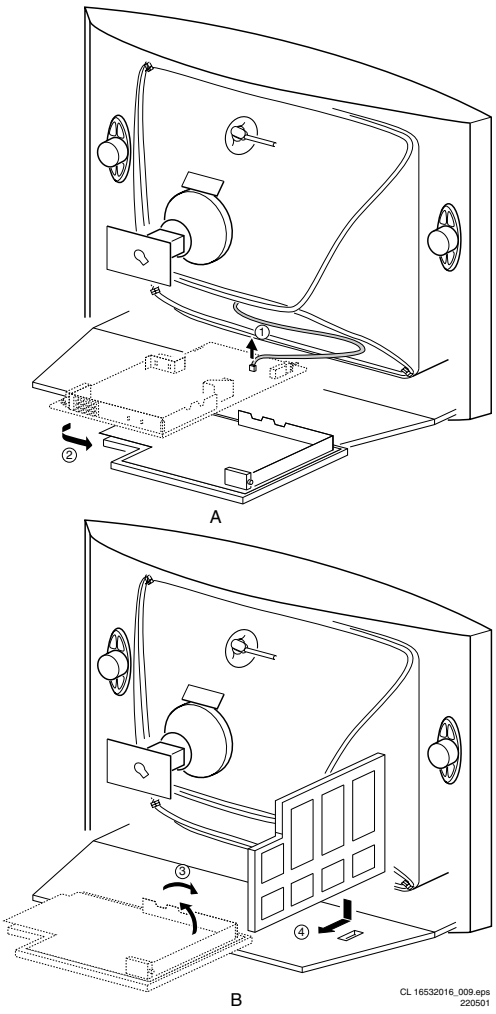


Figure 4-2

4.3 Side I/O Panel Removal

1. Remove the complete Side I/O assembly after unscrewing the two fixation screws [1].
2. Release the 2 fixation clamps [2] and lift the board out of the bracket.

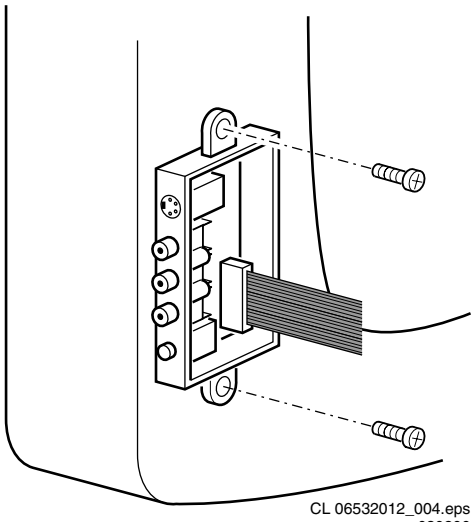


Figure 4-3

4.4 Rear Cover Mounting

Before you mount the rear cover, perform the following checks:

1. Check whether the AC power cord is mounted correctly in its guiding brackets.
2. Replace the strain relief of the AC power cord into the cabinet.
3. Check whether all cables are replaced in their original position.

5. Service Modes, Error Codes and Fault Finding

Index:
1. Test points.
2. Service Modes.
3. Problems and Solving Tips (related to CSM).
4. Error Codes.
5. The Blinking LED Procedure.
6. Protections.
7. Repair Tips.

5.1 Test Points

The chassis is equipped with test points printed on the circuit board assemblies. These test points refer to the functional blocks:

Table 5-1 Test Point Overview L01

Test point	Circuit	Diagram
A1-A2-A3-..	Audio processing	A8, A9 / A11
C1-C2-C3-..	Control	A7
F1-F2-F3-..	Frame drive	A3
I1-I2-I3-..	Tuner & IF	A4
L1-L2-L3-.	Line drive	A2
P1-P2-P3-..	Power supply	A1
S1-S2-S3-..	Synchronisation	A6
V1-V2-V3-..	Video processing	A5

The numbering is in a logical sequence for diagnostics. Always start diagnosing within a functional block in the sequence of the relevant test points for that block.

Perform measurements under the following conditions:
- Service Default Alignment Mode.
- Video: colour bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

Service Default Alignment Mode (SDAM) offers several features for the service technician, while the Customer Service Mode (CSM) is used for communication between dealer and customer.

Service Modes

SW cluster	SW name	UOC-type	Diversity
1AP1	L01HA1-x.y	TDA9552/5	AP 1 page TXT
Abbreviations: H=Hotel, A= Asia Pacific, 1=Z,R and Y system.			

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5.2.1 Service Default Alignment Mode (SDAM)

Purpose
- To change option settings.
- To create a predefined setting to get the same measurement results as given in this manual.
- To display / clear the error code buffer when leaving SDAM with “standby” key on remote control.
- To override SW protections.
- To perform alignments.
- To start the blinking LED procedure.

Specifications
- Tuning frequency:
  - 475.25 MHz for PAL/SECAM (AP-PAL)
  - 61.25 MHz (channel 3) for NTSC set (AP-NTSC)
- Colour system:
  - PAL-BG for AP-PAL.
  - NTSC M for PAL-NTSC
- All picture settings at 50 % (brightness, colour contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
  - (sleep) timer,
  - child/parental lock,
  - blue mute,
  - hotel/hospitality mode
  - auto switch-off (when no IDENT video signal is received for 15 minutes),
  - skip / blank of non-favourite presets / channels,
  - auto store of personal presets,
  - auto user menu time-out.
- Operation hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.

How to enter SDAM
Use one of the following methods:
- Use a System 7 remote control type T374AH (RC-transmitter RG4172BK) and key in the code ‘062596’ directly followed by the ‘M’ (menu) button or
- Short circuit jumper wires 9631 and 9641 on the mono carrier (see Fig. 8-1) and apply AC power. Then press the power button (remove the short circuit after start-up).

Caution: Entering SDAM by short circuiting wires 9631 and 9641 will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could lead to damaging the set.

After activating SDAM, the following screen is visible, with S at the upper right side for recognition.

SDAM Menu

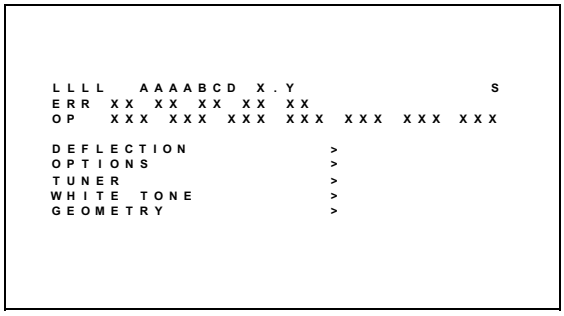

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Figure 5-1

1. **LLLL**
   This is the operation hours counter. It counts the normal operation hours, not the standby hours.
2. **AAAABC-X.Y**
   This is the software identification of the main micro controller:
   - A = the project name (L01H).
   - B = the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
   - C = the feature and language:
   - (Europe: 1 = Basic, Basic Plus and System, English, French, German and Italian)
   - (AP: 1 = Z, R and Y System, English, Malay and Simplified Chinese)

– X = the main software version number.
– Y = the sub software version number.

3. **S**
   Indication of the actual mode. S= SDAM= Service Default Alignment mode.
4. **Error buffer**
   Five errors possible.
5. **Option bytes**
   Seven codes possible.
6. **Deflection**
   To set the deflection values. See chapter 8.3.2 for a detailed description.
7. **Options**
   To set the Option Bytes. See chapter 8.3.1 for a detailed description.
8. **Tuner**
   To align the Tuner. See chapter 8.3.3 for a detailed description.
9. **White Tone**
   To align the White Tone. See chapter 8.3.4 for a detailed description.
10. **Geometry**
    To align the Geometry. See chapter 8.3.5 for a detailed description.

How to navigate
Use one of the following methods:
- In SDAM, select menu items with the CURSOR UP/DOWN key on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the CURSOR UP/DOWN key to display the next / previous menu items.
- With the CURSOR LEFT/RIGHT keys, it is possible to:
  – Activate the selected menu item.
  – Change the value of the selected menu item.
  – Activate the selected submenu.
- When you press the MENU key in a submenu, you will return to the previous menu.

How to store settings
To store settings first go back to the main menu (fig. 5-1) with “MENU” button on the remote control and leave the SDAM with the “STANDBY” button on the remote control.

How to exit
Switch the set to STANDBY by pressing the power button on the remote control transmitter. The error buffer is cleared. (If you switch the set 'off' by removing the AC power, the set will return in SDAM when AC power is re-applied and the error buffer will not be cleared.)

5.2.2 Customer Service Mode (CSM)

Purpose
When a customer is having problems with his TV-set, he can call his dealer. The service technician can than ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severness of the complaint. In a lot of cases he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer.
The CSM is a read only mode, therefore modifications in this mode are not possible.

How to enter
To enter the CSM by pressing RECALL on the System 7 remote control RG4172BK.

After switching ON the Customer Service Mode, the following screen will appear:

CSM Menu

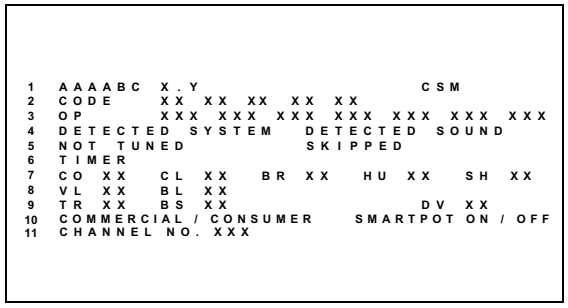
1 AAAABC X.Y CSM
2 CODE XX XX XX XX XX
3 OP XXX XXX XXX XXX XXX XXX XXX
4 DETECTED SYSTEM DETECTED SOUND
5 NOT TUNED SKIPPED
6 TIMER
7 CO XX CL XX BR XX HU XX SH XX
8 VL XX BL XX
9 TR XX BS XX DV XX
10 COMMERCIAL / CONSUMER SMARTPOT ON / OFF
11 CHANNEL NO. XXX

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Figure 5-2

1. Software identification of the main micro controller (see paragraph 5.2.1 for an explanation).
2. Error code buffer (see paragraph 5.4 for more details). Displays the last five errors of the error code buffer.
3. In this line, the Option Bytes (OB) are visible. Each Option Byte is displayed as a decimal number between 0 and 255. The set may not work correctly when an incorrect option code is set. See chapter 8.3.1 for more information on the option settings.
4. Indicates which color and sound system is installed for the selected pre-set.
5. Indicates if the set is not receiving an IDENT signal on the selected source. It will display NOT TUNED.
6. Indicates if the sleep timer is enabled.
7. Value indicates parameter levels at CSM entry. CO= CONTRAST, CL= COLOR, BR= BRIGHTNESS, HU= HUE, SH= SHARPNESS
8. Value indicates parameter levels at CSM entry. VL= VOLUME LEVEL, BL= BALANCE LEVEL
9. Value indicates parameter levels at CSM entry (only for stereo sets). TR= TREBLE, BS= BASS
10. Mode Commercial = Hotel / Institutional mode or mode Consumer. Smartport. Indicates whether the Smart Port is selected or not.
11. Program NO. TV. Indicates to what channel the TV is tuned.

How to exit
Use one of the following methods:
- Press any button of the remote control transmitter keys.
- Press RECALL on a System 7 remote control (the RC-transmitter RG4172BK).
- Switch-off the TV set with the AC power switch.

5.3 Problems and Solving Tips (Related to CSM)

5.3.1 Picture Problems

Note: Below described problems are all related to the TV settings. The procedures to change the value (or status) of the different settings are described.

No colours / noise in picture
Check CSM line 4. Wrong colour system installed. To change the setting:
1. Press the MENU button on the remote control.
2. Select the INSTALLATION sub menu.
3. Select and change the SYSTEM setting until picture and sound are correct.
4. Select the STORE menu item.

Colours not correct / unstable picture
Check CSM line 4. Wrong colour system installed. To change the setting:
1. Press the MENU button on the remote control.

2. Select the INSTALLATION sub menu.
3. Select and change the SYSTEM setting until picture and sound are correct.
4. Select the STORE menu item.

Picture too dark or too bright
Increase / decrease the BRIGHTNESS and / or the CONTRAST value when:
- The picture improves after you have pressed the Smart Picture button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new Personal preference value is automatically stored.

White line around picture elements and text
Decrease the SHARPNESS value when:
- The picture improves after you have pressed the Smart Picture button on the remote control.

The new Personal preference value is automatically stored.

Snowy picture
Check CSM line 5. If this line indicates Not Tuned check the following:
- No or bad antenna signal. Connect a proper antenna signal.
- Antenna not connected. Connect the antenna.
- No channel / pre-set is stored at this program number. Go to the INSTALL menu and store a proper channel at this program number.
- The tuner is faulty (in this case the CODES line will contain error number 10). Check the tuner and replace / repair if necessary.

Snowy picture and/or unstable picture
- A scrambled or decoded signal is received.

Black and white picture
Increase the COLOR value when:
- The picture improves after you have pressed the Smart Picture button on the remote control.

The new Personal preference value is automatically stored.

Menu text not sharp enough
Decrease the CONTRAST value when:
- The picture improves after you have pressed the Smart Picture button on the remote control.

The new Personal preference value is automatically stored.

5.3.2 Sound Problems

No sound or sound too loud (after channel change / switching on)
Increase / decrease the VOLUME level when the volume is OK after you switched on the CSM. The new Personal preference value is automatically stored.

5.4 Error Buffer

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is written at the left side and all other errors shift one position to the right.

5.4.1 How to Read the Error Buffer

Use one of the following methods:
- On screen via the SDAM (only if you have a picture). Examples:
  - ERROR: **0 0 0 0 0** : No errors detected
  - ERROR: **6 0 0 0 0** : Error code 6 is the last and only detected error
  - ERROR: **9 6 0 0 0** : Error code 6 was first detected and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See next paragraph.

5.4.2 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:
- When you exit SDAM or CSM with the STANDBY command on the remote control (when leaving SDAM, by disconnecting the set from AC power, the error buffer is not reset).
- If the content of the error buffer has not changed for 50 hours, it resets automatically.

5.4.3 Error Codes

In case of non-intermittent faults, clear the error buffer before you begin the repair. This to ensure that old error codes are no longer present.
If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause (e.g., a fault in the protection detection circuitry can also lead to a protection).

Table 5-2 Error Code Table

ERROR	Device	Error description	Def. item	Diagram
0	Not applicable	No Error		
1	Not applicable	X-Ray Protection (USA)	2465, 7460	A2
2	Not applicable	Horizontal Protection	7460, 7461, 7462, 7463, 6467	A2
3	TDA8359/TDA9302	Vertical Protection	7861, VloAux +13v	A2, A3
4	MSP34X5/TDA9853	MAP I2C identification error	7831, 7861	A9 or A11
5	TDA95XX	POR 3.3V / 8V Protection	7200, 7560, 7480	A1, A2. A5, A6, A7
6	I2C bus	General I2C bus error	7200, 3624, 3625	A7
7	Not applicable	-	-	-
8	Not applicable	E/W Protection (Large Screen)	7400, 3405, 3406, 3400	A2
9	M24C08	NVM I2C identification error	7602, 3611, 3603, 3604	A7
10	Tuner	Tuner I2C identification error	1000, 7482	A2, A4
11	TDA6107/8	Black current loop protection	7330, RGB amps, CRT	B1, B2
12	M65669	MAP I2C identification error (USA)	7803	P

Note: Error 7 is Not applicable, Due to ASD issue.

5.5 The Blinking LED Procedure

Via this procedure, you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.
Go into the SDAM menu with one of the following methods:

- '062596 M', on a System 7 remote control (the RC-transmitter RG4172BK).
- Short wires 9631 and 9641 on the mono carrier and apply AC power. Then press the power button (remove the short after start-up).

As soon as you are in SDAM the blinking LED procedure will start.

Error-codes are shown as follows:

- n short blinks (n = the number of n indicates the error code number.),
- a pause of 1,5 s,
- n short blinks (for the next error),
- when all the error-codes are displayed, the sequence finishes with a LED blink of 3 s,
- the sequence starts again.

Example of error buffer: **12 9 6 0 0**
After entering SDAM:

- 12 short blinks followed by a pause of 1,5 s,
- 9 short blinks followed by a pause of 1,5 s,
- 6 short blinks followed by a pause of 1,5 s,
- 1 long blink of 3 s to finish the sequence,
- the sequence starts again.

5.6 Protections

If a fault situation is detected an error code will be generated and if necessary, the set will be put in the protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases, the microprocessor does not put the set in the protection mode. The error codes of the error buffer can be read via the service menu (SDAM) or the blinking LED procedure.

To get a quick diagnosis the chassis has two service modes implemented:

- The Customer Service Mode (CSM).
- The Service Default Alignment Mode (SDAM). Start-up of the set in a predefined way and adjustment of the set via a menu and with the help of test patterns.

5.7 Repair Tips

Below some failure symptoms are given, followed by a repair tip.

- **Set is dead and makes hiccuping sound**
  'MainSupply' is available. Hiccuping stops when de-soldering L5561, meaning that problem is in the 'MainSupply' line. No output voltages at LOT, no horizontal deflection. Reason: line transistor TS7460 is defective.
- **Set is dead, and makes no sound**
  Check power supply IC7520. Result: voltage at pins 1, 3, 4, 5 and 6 are about 180 V and pin 8 is 0 V. The reason why the voltage on these pins is so high is because the output driver (pin 6) has an open load. That is why MOSFET TS7521 is not able to switch.
  Reason: feedback resistor 3523 is defective.
  Caution: be careful measuring on the gate of TS7521; circuitry is very high ohmic and can easily be damaged! (first connect measuring equipment to ground, then to the gate).
- **Set is in hiccup mode and shuts down after 8 s**
  Blinking LED (set in SDAM mode) indicates error 5. As it is unlikely that uP, POR and +8V protection happen at the same time, measure the +8V. If this voltage is missing, check transistor TS7480.
- **Set is non-stop in hiccup mode**
  Set is in over current mode; check the secondary sensing (opto coupler 7515) and the MainSupply voltage. Signal Stdby_con must be logic low under normal operation conditions and goes to high (3.3 V) under standby and fault conditions.
- **Set turns on, but without picture and sound**
  The screen shows snow, but OSD and other menus are okay. Blinking LED procedure indicates error 11, so problem is expected in the tuner (pos. 1000). Check presence of supply voltages. As Vlotaux+5V at pin 5 and 7 are okay, VT_supply at pin 9 is missing. Conclusion: resistor 3460 is defective.
- **Set turns on, but with a half screen at the bottom. Sound is okay**
  Blinking LED (set in SDAM mode) indicates error 3. Check Vlotaux+13V and +50V. If they are okay, problem is expected in the vertical amplifier IC7471. Measure with a scope the waveform on pin 17 of the UOC. Measure also at pin 1 of IC7471. If here the signal is missing, a defective resistor R3244 causes the problem.

8. Alignments

Index:
General Alignment Conditions
Hardware Alignments
Software Alignments and Settings

Note:
- The Service Default Alignment Mode (SDAM) is described in chapter 5.
- Menu navigation is done with the 'CURSOR UP, DOWN, LEFT or RIGHT' keys of the remote control transmitter.
- Figures can deviate slightly from the actual situation, due to different set executions or software versions.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:
- AC voltage and frequency: according to country's standard.
- Connect the set to the AC power via an isolation transformer.
- Allow the set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use the cooling fins / plates as ground.
- Test probe: Ri > 10 MΩ; Ci < 2.5 pF.
- Use an isolated trimmer / screwdriver to perform the alignments.

8.2 Hardware Alignments

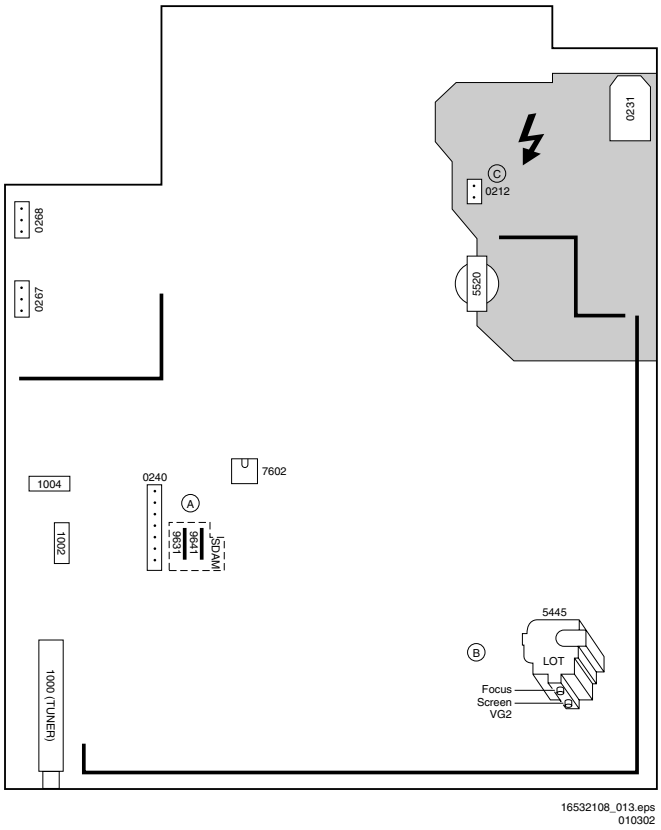


Figure 8-1 Hardware Alignments

8.2.1 Vg2 Adjustment (AKB method)

1. Connect the RF output of a pattern generator to the antenna input. Test pattern is a 'black' picture (blank screen on CRT **without** any OSD info). 0r set TV to AV mode.
2. Activate the SDAM.
3. Select options and set item "protection" to off.
4. Select Deflection menu:
   – Set **AKB** to 1 (is OFF position, CCC loop disabled)
   – Set BRIGHTNESS to 75%
   – CONTRAST to zero.
5. Unplug deflection coil connector "0222" (one bright vertical line).
6. Adjust VG2 until vertical line just appears.
7. Connect back the deflection coil connector "0222"
8. Set **AKB** back to 0 (=ON).
9. Restore BRIGHTNESS and CONTRAST to normal picture setting.
10. Select options and set item "protection" back to on.
11. Return to the SDAM (main menu) via the MENU key
12. Exit service mode

8.2.2 Focusing

1. Tune the set to a circle or crosshatch test pattern (use an external video pattern generator).
2. Choose picture mode NATURAL with the 'SMART PICTURE' button on the remote control transmitter.
3. Adjust the FOCUS potentiometer (see Fig. 8-1) until the vertical lines at 2/3 from east and west, at the height of the centreline, are of minimum width without visible haze.

8.3 Software Alignments and Settings

Enter the Service Default Alignment Mode (see chapter 5).
The SDAM menu will now appear on the screen.
Select one of the following alignments:
1. OPTIONS
2. DEFLECTION
3. TUNER
4. WHITE TONE
5. GEOMETRY

8.3.1 Options

Table 8-1 Option Menu

LLLL AAAABC X.Y	S
ERR XX XX XX XX XX	
OP XXX XXX XXX XXX XXX XXX XXX	
OB0	XXX
OB1	XXX
OB2	XXX
OB3	XXX
OB4	XXX
OB5	XXX
OB6	XXX
LOAD DEFAULT	>
WATCHDOG	ON / OFF
PROTECTION	ON / OFF
SYSTEM	MULTI / I-DK
SOUND	NONE / 3415 / 3465
DEFAULT	BG / I / DK/ M
QSS	ON / OFF
PIN2	NONE / UIR MSG
PIN77	NONE / I2C
CLOCK	OSD / LED / NONE
BUZZER	NONE / INT / EXT
EW	ON / OFF
WIDESCREEN	ON / OFF
TUNER	NONE / APLS / PHILIPS
LNA	ON / OFF
CHINA	ON / OFF
US REGION CODE	ON / OFF
WSL	NONE / 4136 / 1836
ACTIVE-OFF LED	ON / OFF
RGB	ALWAYS / AV
AV1	ON / OFF
AV2	ON / OFF
AV3	ON / OFF
S-VIDEO	ON / OFF
NO IDENT STANDBY	ON / OFF

Options are used to control the presence / absence of certain features and hardware.

How to change an Option Byte

An Option Byte represents a number of different options. Changing these bytes directly makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OB1.. OB7) with the MENU UP/ DOWN keys, and enter the new value.

Leaving the OPTION submenu and switching the set off with the standby button on the remote saves the changes in the Option Byte settings. Some changes will only take effect after the set has been switched OFF and ON with the AC power switch (cold start).

How to calculate the value of an Option Byte

Calculate an Option Byte value (OB1 .. OB7) in the following way:

1. Check the status of the single option bits (OP): are they enabled (1) or disabled (0).
2. When an option bit is enabled (1) it represents a certain value (see first column 'value between brackets' in first table below). When an option bit is disabled, its value is 0.
3. The total value of an Option Byte is formed by the sum of its eight option bits. See second table below for the correct Option Bytes per typenumber.

Table 8-2 Option Bytes

Bit(value)	OB1	OB2	OB3	OB4	OB5	OB6	OB7
0 (1)	OP10	OP20	OP30	OP40	OP50	OP60	OP70
1 (2)	OP11	OP21	OP31	OP41	OP51	OP61	OP71
2 (4)	OP12	OP22	OP32	OP42	OP52	OP62	OP72
3 (8)	OP13	OP23	OP33	OP43	OP53	OP63	OP73
4 (16)	OP14	OP24	OP34	OP44	OP54	OP64	OP74
5 (32)	OP15	OP25	OP35	OP45	OP55	OP65	OP75
6 (64)	OP16	OP26	OP36	OP46	OP56	OP66	OP76
7 (128)	OP17	OP27	OP37	OP47	OP57	OP67	OP77
Total:	Sum	Sum	Sum	Sum	Sum	Sum	Sum

Table 8-3 ITV AP Options

L01 ITV AP Options	OB1	OB2	OB3	OB4	OB5	OB6	OB7
21HT2211/68Z	9	16	34	2	14	113	0
21HT2212/67R	11	4	34	9	10	113	0
21HT2212/69R	9	20	34	9	10	113	0
21HT2212/93R	25	20	50	9	10	113	0
25HT2011/69Z	9	16	34	2	22	113	0
25HT2011/93Z	25	16	50	2	22	113	0
25HT2011/94Z	9	16	34	2	30	113	0
25HT2212/67R	9	20	34	9	10	113	0
25HT2212/69R	9	20	34	9	10	113	0
25HT2012/79R	9	20	34	9	10	113	0
25HT2012/93R	25	20	50	9	10	113	0
25HT2217/69Y	9	21	34	9	30	113	0
25HT2217/79Y	9	21	34	9	30	113	0
25HT2217/93Y	25	21	50	9	30	113	0
29HT2011/93Z	25	16	50	2	30	113	0
29HT2217/69Y	9	21	34	9	22	113	0
29HT2217/93Y	25	21	50	9	22	113	0

Option Bit Assignment

Following are the option bit assignments for all L01 ITV software clusters.

Table 8-4

Options	Bit	Description	Value
Byte 0	7	Multi-system	0 = Multi, 1 = Dual I-DK
(TV System)	6		
	5		
	4	Default sound	1 = BG (or West EU), 2 =I (or UK), 3 = DK (or East EU), 4 = M, 5 = LL (or France)
	3		
	2		
	1	Sound Board	0 = Mono (no sound board), 1 = MSP 3415G, 2 = MSP 3445G - (BTSC), 3 = MSP 3465G - AV stereo
	0		
Byte 1	7	Not Used	
(Pin Usage)	6	Not Used	
	5	Not Used	
	4	QSS	1 = UOC and chasis support QSS
	3	Pin 2	0 = None (not used), 1 = UIR-Link Message Input
	2		
	1	Pin 77	0 = None (not used), 1 = SPI I2C (at 32-pin card interface)
	0		
Byte 2	7	Pin 78	0 = None (not used), 1 =Wide Screen, 2 = Rotation/Tilt
(Devices)	6		
	5	EW	1 = Chasis supports East-West alignment
	4	China	1 = Vision IF is set for China
	3	Radio	1 = Tuner has FM radio feature and TV chasis support FM radio
	2	LNA	1 = Tuner has LNA feature
	1	Tuner	0 = None (no tuner), 1 = Philips (model), 2 = Alps (model)
	0		
Byte 3	7	Not Used	
(Devices)	6	Not Used	
	5	Not Used	
	4	US Region Code	1 = US Region code is used in SmartPort (except command 0x00)
	3	SmartPort	1 = Chasis supports SmartPort (SPI or I2C)
	2	Active-Off LED	1 = LED ON
	1	WSL	0 = None (no used), 1 =4136 (IR receiver model), 2 =1836 (IR receiver model)
	0		
Byte 4	7	Not Used	
(AV, Tuning)	6	Not Used	
	5	Not Used	
	4	AVYC	1 = AV available
	3	AV3	1 = AV available
	2	AV2	1 = AV available
	1	AV1	1 = AV available
	0	RGB	0 = RGB input always allowed, 1 = RGB insertion allowed only when current input source is AV1
Byte 5	7	Not Used	
(Feature)	6	Protection	1 = Protection (TV go to standby). 0 = No protection but errors are still logged.
	5	WatchDog	1 = Watchdog feature is enabled
	4	No Ident Standby	1 = TV goes standby after 10mins of no RF signal.
	3	Buzzer Type	0 = None (no buzzer), 1 = Internal (generated by TV microp), 2 = External (generated by I2C device)
	2		
	1	Clock Type	0 = None (no clock), 1 = OSD, 2 = LED Module
	0		
Byte 6	7	Not Used	
	6	Not Used	
	5	Not Used	
	4	Not Used	
	3	Not Used	
	2	Not Used	
	1	Not Used	
	0	Not Used	

8.3.2 Deflection

The Deflection Sub menu contains the following items:
- **AKB** ON to enable, OFF to disable the 'black current loop' (AKB = Auto Kine Bias).
- **Brightness** (set Brightness)
- **Contrast** (set Contrast)

"See VG2 alignment"

Deflection Sub-menu

CL 65532108_008.eps
310801

Figure 8-2

8.3.3 Tuner

The Tuner Sub menu contains the following items:
Note: Described alignments are only necessary when the NVM (item 7602) is replaced.

Tuner Sub-menu

CL 16532108_010.eps
131201

Figure 8-3

IF PLL
Phase Locked Loop Used for FST tuning systems.
Adjust the IFPLL value **(default value is 30)** with the LEFT/RIGHT cursor keys.

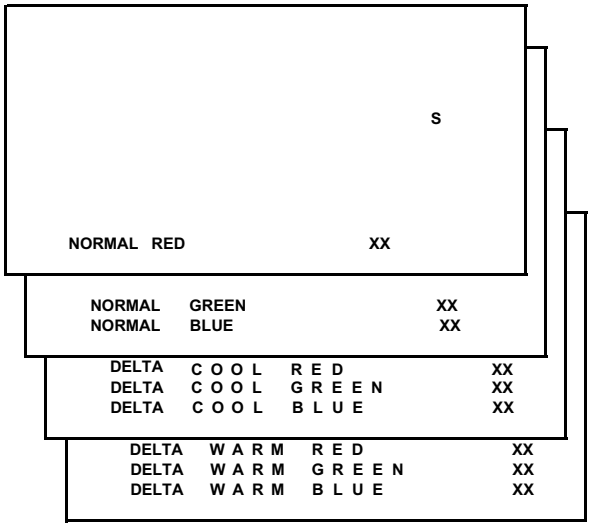
AGC (AGC take over point)
Set the external pattern generator to a colour bar video signal and connect the RF output to aerial input. Set amplitude to 10 mV and set frequency to 475.25 MHz (PAL).
Connect a DC multimeter to pin 1 of the tuner (item 1000 on the main panel).
1. Activate the SDAM.
2. Go to the TUNER sub menu.
3. Select AGC with the UP/DOWN cursor keys.
4. Adjust the AGC-value **(default value is 28)** with the LEFT/RIGHT cursor keys until the voltage at pin 1 of the tuner lies between 3.8 and 2.3 V.
5. Switch the set to STANDBY.

SL (Slicing level)
Slicing level for vertical sync
This adjustment is always set to 0 (for NTSC system only).

CL (cathode drive level)
Adjust the CL value **(default value is 4)** with the LEFT/RIGHT cursor keys.

8.3.4 White Tone

White Tone Menu



CL 16532108_007.eps
131201

Figure 8-4

In the WHITE TONE sub menu, the values of the black cut off level can be adjusted. Normally, no alignment is needed for the WHITE TONE. You can use the given default values.
The colour temperature mode (NORMAL, COOL and WARM) and the colour (RED, GREEN, and BLUE) can be selected with the UP/DOWN RIGHT/LEFT cursor keys. The value can be changed with the LEFT/RIGHT cursor keys. First, select the values for the NORMAL colour temperature. Then select the values for the DELTA COOL and DELTA WARM mode. After alignment, switch the set to standby, in order to store the alignments.

Default settings:
- **NORMAL** (colour temperature = 11500 K):
  - NORMAL RED = 32
  - NORMAL GREEN = 35
  - NORMAL BLUE = 30
- **DELTA COOL** (colour temperature = 14000 K):
  - DELTA COOL RED = 0
  - DELTA COOL GREEN = -5
  - DELTA COOL BLUE = 5
- **DELTA WARM** (colour temperature = 8200 K):
  - DELTA WARM RED = 8
  - DELTA WARM GREEN = -3
  - DELTA WARM BLUE = 2

8.3.5 Geometry

The geometry alignments menu contains several items to align the set, in order to obtain correct picture geometry.

Geometry

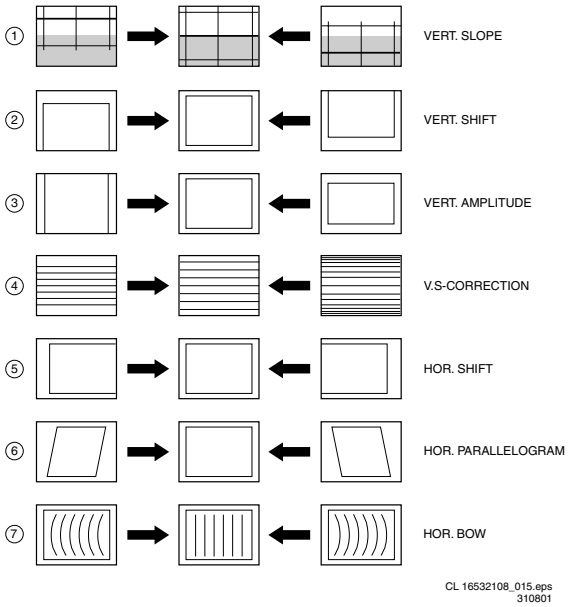


Figure 8-5

Connect an external video pattern generator to the aerial input of the TV-set and input a crosshatch test pattern. Set the generator amplitude to at least 1 mV and set frequency to 475.25 MHz (PAL).

1. Activate the SDAM menu (see chapter 5).
2. Go to the GEOMETRY sub menu.

Now you can perform the following alignments:

- **Horizontal Parallelogram (HP)** Align straight vertical lines in the top and the bottom; vertical rotation around the centre.
- **Horizontal Bow (HB)** Align straight horizontal lines in the top and the bottom; horizontal rotation around the centre.
- **Horizontal Shift (HS)** Align the horizontal centre of the picture to the horizontal centre of the CRT.
- **Vertical slope (VS)** Align the vertical centre of the picture to the vertical centre of the CRT. This is the first of the vertical alignments to perform. For an easy alignment, set SBL to ON.
- **Vertical Amplitude (VA)** Align the vertical amplitude so that the complete test pattern is visible.
- **Vertical S-Correction (SC)** Align the vertical linearity, meaning that vertical interval of a grid pattern must be equal over the entire screen height.
- **Vertical Shift (VSH)** Align the vertical centring so that the test pattern is located vertically in the middle. Repeat the 'vertical amplitude' alignment if necessary.
- **Service blanking (SBL)** Switch the blanking of the lower half of the screen ON or OFF (to be used in combination with the vertical slope alignment).

For EW versions :

- Set Horizontal Parallelogram **HP** to prevent the picture from slanting to one side.
- Set Horizontal Bow **HB** to prevent the top and bottom of picture from bending to the sides.
- Select Vertical Zoom **VX** to align the vertical linearity over the entire screen height (for 16 : 9 applications only).
- Set Trapezium Correction **TC** to align the lines at the vertical sides.
- Select East-West Width **EW** and align the picture width until the side castellations disappear.
- Select East-West Parabola / width **PW** and align the vertical sides until the sides are straightened.
- Select Upper Corner Parabola **UCP** to straighten the top of the vertical lines at the sides.
- Select Lower Corner Parabola **LCP** to straighten the bottom of the vertical lines at the sides.
- Repeat the last 5 steps if necessary.

Geometry alignments menu

Table 8-5

	S
VX	XX
SC	XX
SBL	ON/OFF
VS	XX
VSH	XX
VA	XX
HS	XX
EW	XX
PW	XX
UCP	XX
LCP	XX
TC	XX
HP	XX
HB	XX

9. Circuit Description

Index:

1. Introduction
2. Audio Signal Processing
3. Video Signal Processing
4. Synchronisation
5. Deflection
6. Power Supply
7. Control
8. Abbreviations

Note:

- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the block diagram in chapter 6, or the electrical diagrams in chapter 7. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The L01 chassis is a global TV chassis for the model year 2001 and is used for TV sets with screen sizes from 14" to 21" (small screen) and 21" - 34" (large screen), in Super Flat and Real Flat executions.
The standard architecture consists of a Main panel, a Picture Tube panel, a Side I/O panel and a Top Control panel. In some executions, a Picture In Picture (PIP) panel is used.
The Main panel consists primarily of conventional components with hardly any surface mounted devices.

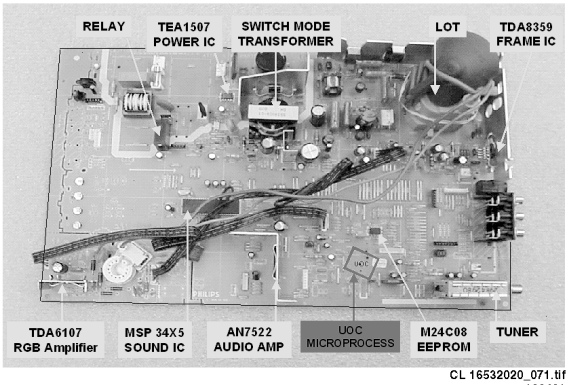


Figure 9-1

The functions for video processing, microprocessor (µP) and teletext (TXT) decoder are combined in one IC (TDA958xH), the so-called Ultimate One Chip (UOC). This chip is (surface) mounted on the copper side of the LSP.

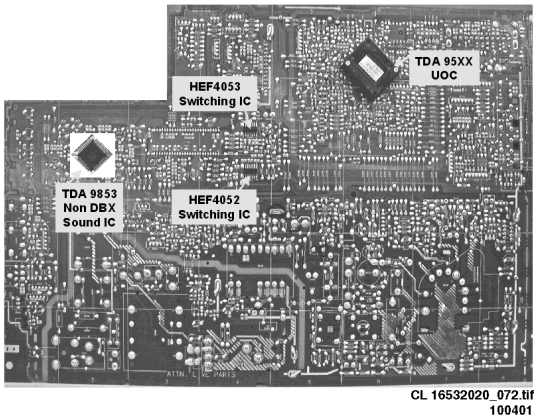


Figure 9-2

The L01 is divided into 2 basic systems, i.e. mono and stereo sound. While the audio processing for the mono sound is done in the audio block of the UOC, an external audio processing IC is used for stereo sets.

The tuning system features 100 (or 125) channels with on-screen display. The main tuning system uses a tuner, a microcomputer, and a memory IC mounted on the main panel. Also, in some type numbers, an FM radio is implemented with 40 pre-set channels.
The microcomputer communicates with the memory IC, the customer keyboard, remote receiver, tuner, signal processor IC and the audio output IC via the I^2C bus. The memory IC retains the settings for favourite stations, customer-preferred settings, and service/factory data.
The on-screen graphics and closed caption decoding are done within the microprocessor, and then sent to the signal processor IC to be added to the main signal.

The chassis uses a Switching Mode Power Supply (SMPS) for the main voltage source. The chassis has a 'hot' ground reference on the primary side and a cold ground reference on the secondary side of the power supply and the rest of the chassis.

9.2 Audio Signal Processing

9.2.1 Stereo

In stereo sets, the signal goes via the SAW filter (position 1004 in case of QSS demodulation and 1003 in case of Intercarrier demodulation), to the audio demodulator part of the UOC IC7200. The stereo audio output on pin 33 goes, via TS7201, to the stereo decoder 7831.
The switch inside the stereo decoder 7831 selects (via I^2C) either the internal decoder or an external source.
The NICAM + 2CS AM/FM stereo decoder is an ITT MSP34X5. The output is fed to the to the audio amplifier (AN7522 at position 7901). The volume level is controlled at this IC (pin 9) by a control line (VolumeMute) from the microprocessor. The audio signal from 7901 is then sent to the speaker/headphone output panel.

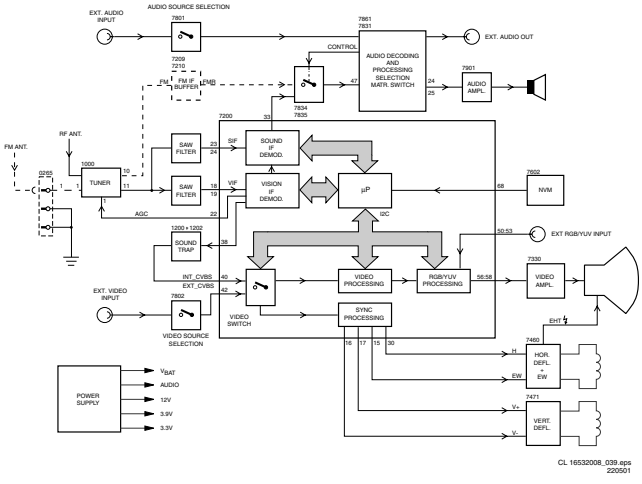


Figure 9-3

9.2.2 Mono

In mono sets, the signal goes via the SAW filter (position 1004 in case of QSS demodulation and 1003 in case of Intercarrier demodulation), to the audio demodulator part of the UOC IC7200. The audio output on pin 48 goes directly, via the smart sound circuit (7941 for Bass and 7942 for Treble) and buffer (7943), to the audio amplifier (AN7523 at position 7902).
The volume level is controlled at this IC (pin 9) by a 'VolumeMute' control line from the microprocessor.
The audio signal from IC7902 is then sent to the speaker/ headphone output panel.

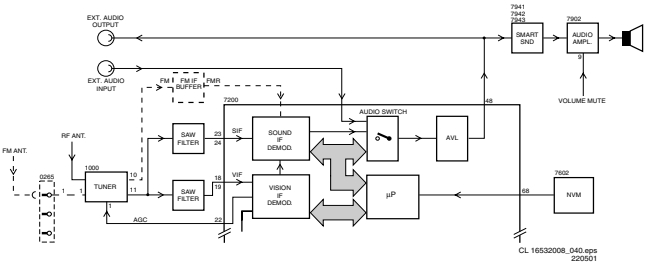


Figure 9-4

9.2.3 FM radio (if present)

The FM radio uses the 10.7 MHz concept. This SIF frequency is available at pin 10 of the tuner. Via a pre-amplifier (TS7209 and TS7210), the signal is fed for demodulation to either the UOC (for mono FM radio) or by the Micronas MSP34X5 (for stereo FM radio).

9.3 Video Signal Processing

9.3.1 Introduction

The video signal-processing path consists of the following parts:
- RF signal processing.
- Video source selection.
- Video demodulation.
- Luminance/Chrominance signal processing.
- RGB control.
- RGB amplifier

The processing circuits listed above are all integrated in the UOC TV processor. The surrounding components are for the adaptation of the selected application. The I^2C bus is for defining and controlling the signals.

9.3.2 RF Signal Processing

The incoming RF signal goes to the tuner (pos. 1000), where the IF signal is developed and amplified. The IF signals then exits the tuner from pin 11 to pass through the SAW filter (position 1002 in case of QSS demodulation and 1003 in case of Intercarrier demodulation). The shaped signal is then applied to the IF processor part of the UOC (pos. 7200).
Tuner AGC (Automatic Gain Control) will reduce the tuner gain and thus the tuner output voltage when receiving strong RF signals. Adjust the AGC take-over point via the Service Alignment Mode (SAM). The tuner AGC starts working when the video-IF input reaches a certain input level and will adjust this level via the I^2C bus. The tuner AGC signal goes to the tuner (pin 1) via the open collector output (pin 22) of the UOC.
The IC also generates an Automatic Frequency Control (AFC) signal that goes to the tuning system via the I^2C bus, to provide frequency correction when needed.
The demodulated composite video signal is available at pin 38 and then buffered by transistor 7201.

3 V), the RGB signals at pins 51, 52 and 53 are inserted into

9.3.3 Video Source Selection

The Composite Video Blanking Signal (CVBS) from buffer 7201 goes to the audio carrier trap filters (1200, 1201, or 1202 depending on the system used) to remove the audio signal. The signal then goes to pin 40 of IC7200. The internal input switch selects the following input signals:
- Pin 40: terrestrial CVBS input
- Pin 42: external AV1 CVBS input
- Pin 44: external Side I/O CVBS or AV2 Luminance (Y) input
- Pin 45: external AV2 Chrominance (C) input

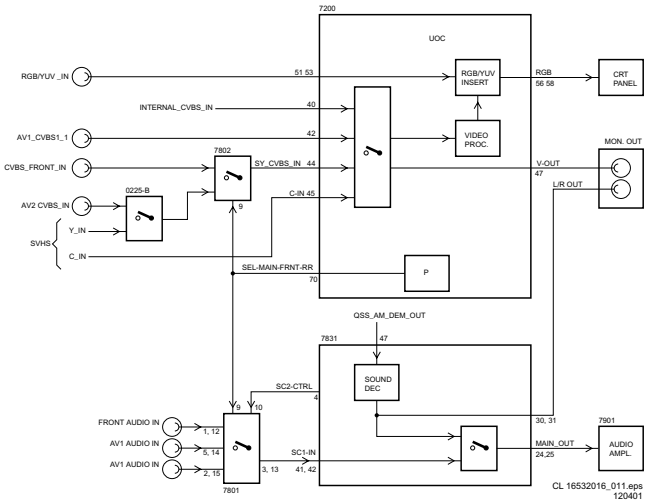


Figure 9-5

Once the signal source is selected, a chroma filter calibration is performed. The received colour burst sub-carrier frequency is used for this. Correspondingly, the chroma band pass filter for PAL/NTSC processing or the cloche filter for SECAM processing is switched on. The selected luminance (Y) signal is supplied to the horizontal and vertical synchronisation processing circuit and to the luminance processing circuit. In the luminance-processing block, the luminance signal goes to the chroma trap filter. This trap is switched 'on' or 'off' depending on the colour burst detection of the chroma calibration circuit.
The group delay correction part can be switched between the BG and a flat group delay characteristic. This has the advantage that in multi-standard receivers no compromise has to be made for the choice of the SAW filter.

9.3.4 Video Demodulation

The colour decoder circuit detects whether the signal is a PAL, NTSC or SECAM signal. The result is made known to the auto system manager. The PAL/NTSC decoder has an internal clock generator, which is stabilised to the required frequency by using the 12 MHz clock signal from the reference oscillator of the microcontroller/teletext decoder.
The base-band delay line is used to obtain a good suppression of cross colour effects.
The Y signal and the delay line outputs U and V are applied to the luminance/chroma signal processing part of the TV processor.

9.3.5 Luminance/Chrominance signal Processing

The output of the YUV separator is fed to the internal YUV switch, which switches between the output of the YUV separator or the external YUV (for DVD or PIP) on pins 51-53. Pin 50 is the input for the insertion control signal called 'FBL-1'. When this signal level becomes higher than 0.9 V (but less than the picture by using the internal switches.

Also some picture improvement features are implemented in this part:

- Black stretch This function corrects the black level of incoming signals, which have a difference between the black level and the blanking level. The amount of extension depends upon the difference between actual black level and the darkest part of the incoming video signal level. It is detected by means of an internal capacitor.
- White stretch This function adapts the transfer characteristic of the luminance amplifier in a non-linear way depending on the average picture content of the luminance signal. It operates in such a way that maximum stretching is obtained when signals with a low video level are received. For bright pictures, stretching is not active.
- Dynamic skin tone correction This circuit corrects (instantaneously and locally) the hue of those colours which are located in the area in the UV plane that matches the skin tone. The correction is dependent on the luminance, saturation and distance to the preferred axis.

The YUV signal is then fed to the colour matrix circuit, which converts it to R, G and B signals.
The OSD/TXT signal from the microprocessor is mixed with the main signal at this point, before being output to the CRT board (pins 56, 57 and 58).

9.3.6 RGB Control

The RGB control circuit enables the picture parameters contrast, brightness and saturation to be adjusted, by using a combination of the user menus and the remote control. Additionally automatic gain control for the RGB signals via cut-off stabilisation is achieved in this functional block to obtain an accurate biasing of the picture tube. Therefor this block inserts the cut-off point measuring pulses into the RGB signals during the vertical retrace period.

The following additional controls are used:

- **Black current calibration loop** Because of the 2-point black current stabilisation circuit, both the black level and the amplitude of the RGB output signals depend on the drive characteristics of the picture tube. The system checks whether the returning measuring currents meet the requirements, and adapt the output level and gain of the circuit when necessary. After stabilisation of the loop, the RGB drive signals are switched on. The 2-point black level system adapts the drive voltage for each cathode in such a way that the two measuring currents have the right value. This is done with the measurement pulses during the frame flyback. During the first frame, three pulses with a current of 8 μA are generated to adjust the cut off voltage. During the second frame, three pulses with a current of 20 μA are generated to adjust the 'white drive'. This has as a consequence, that a change in the gain of the output stage will be compensated by a gain change of the RGB control circuit. Pin 55 (BLKIN) of the UOC is used as the feedback input from the CRT base panel.
- **Blue stretch** This function increases the colour temperature of the bright scenes (amplitudes which exceed a value of 80% of the nominal amplitude). This effect is obtained by decreasing the small signal gain of the red and green channel signals, which exceed this 80% level.
- **Beam current limiting** A beam current limiting circuit inside the UOC handles the contrast and brightness control for the RGB signals. This prevents the CRT from being overdriven, which could otherwise cause serious damage in the line output stage. The reference used for this purpose is the DC voltage on pin 54 (BLCIN) of the TV processor. Contrast and brightness reduction of the RGB output signals is therefore proportional to the voltage present on this pin. Contrast reduction starts when the voltage on pin 54 is lower than 2.8 V. Brightness reduction starts when the voltage on pin 54 is less than 1.7 V. The voltage on pin 54 is normally 3.3 V (limiter not active). During set switch-off, the black current control circuit generates a fixed beam current of 1 mA. This current ensures that the picture tube capacitance is discharged. During the switch-off period, the vertical deflection is placed in an over-scan position, so that the discharge is not visible on the screen.

9.3.7 RGB Amplifier

From outputs 56, 57 and 58 of IC7200, the RGB signals are applied to the integrated output amplifier (7330) on the CRT panel. Via the outputs 7, 8 and 9 the picture tube cathodes are driven.
The supply voltage for the amplifier is +200 V and is derived from the line output stage.

9.3.8 SCAVEM (if present)

The SCAn VElocity Modulation (SCAVEM) circuitry is implemented in the layout of the picture tube panel. It is thus not an extra module. This circuit influences the horizontal deflection as a function of the picture content. In an ideal square wave, the sides are limited in slope due to a limited bandwidth (5 MHz).

SCAVEM will improve the slope as follows:
At a positive slope, a SCAVEM current is generated which supports the deflection current. At the first half of the slope, the spot is accelerated and the picture is darker. At the second half of the slope, the spot is delayed and the slope becomes steeper.
At the end of the slope, the SCAVEM-current decays to zero and the spot is at the original position. An overshoot occurs which improves the impression of sharpness.
At the negative slope, the SCAVEM-current counteracts the deflection. During the first half of the slope, the spot is delayed and the slope becomes steeper. During the second half the spot accelerates, the SCAVEM-current is zero at the end of the slope.

Via the three resistors R3371, R3379 and R3386, Red, Green and Blue are added together, buffered and offered to the emitter of TS7363. On the collector of this transistor, configured in a common base, the sum of these 3 signals is obtained. Via the emitter follower formed with TS7360, this signal is conveyed to the differentiator C2376 and R3392. Only the high frequencies are differentiated (small RC-time).
The positive and negative pulses of this signal drive respectively TS7365 and TS7362 into conductivity. The DC setting of the output stage is set by R3363, R3374, R3378 and R3384. The working voltage of the transistors is settled at half the supply voltage.
At the positive section of the pulse, the current flows through TS7365 and the SCAVEM coil. At the negative section of the pulse, the current flows through TS7362 and the SCAVEM coil.

9.4 Synchronisation

Inside IC7200 (part D), the vertical and horizontal sync-pulses are separated. These 'H' and 'V' signals are synchronised with the incoming CVBS signal. They are then fed to the H- and V-drive circuits and to the OSD/TXT circuit for synchronisation of the On Screen Display and Teletext (or Closed Caption) information.

9.5 Deflection

9.5.1 Horizontal Drive

The horizontal drive signal is obtained from an internal VCO, which is running at twice the line frequency. This frequency is

divided by two, to lock the first control loop to the incoming signal.
When the IC is switched 'on', the 'Hdrive' signal is suppressed until the frequency is correct.
The 'Hdrive' signal is available at pin 30. The 'Hflybk' signal is fed to pin 31 to phase lock the horizontal oscillator, so that TS7462 cannot switch 'on' during the flyback time.
The 'EWdrive' signal for the E/W circuit (if present) is available on pin 15, where it drives transistor 7400 to make linearity corrections in the horizontal drive.

When the set is switched on, the '+8V' voltage goes to pin 9 of IC7200. The horizontal drive starts up in a soft start mode. It starts with a very short T_{ON} time of the horizontal output transistor. The T_{OFF} of the transistor is identical to the time in normal operation. The starting frequency during switch on is therefore about 2 times higher than the normal value. The 'on' time is slowly increased to the nominal value in 1175 ms. When the nominal value is reached, the PLL is closed in such a way that only very small phase corrections are necessary.

The 'EHTinformation' line on pin 11 is intended to be used as a 'X-ray' protection. When this protection is activated (when the voltage exceeds 6 V), the horizontal drive (pin 30) is switched 'off' immediately. If the 'H-drive' is stopped, pin 11 will become low again. Now the horizontal drive is again switched on via the slow start procedure.
The 'EHTinformation' line (Aquadag) is also fed back to the UOC IC7200 pin 54, to adjust the picture level in order to compensate for changes in the beam current.

The filament voltage is monitored for 'no' or 'excessive' voltage. This voltage is rectified by diode 6447 and fed to the emitter of transistor TS7443. If this voltage goes above 6.8 V, TS7443 will conduct, making the 'EHT0' line 'high'. This will immediately switch off the horizontal drive (pin 30) via the slow stop procedure.

The horizontal drive signal exits IC7200 at pin 30 and goes to TS7462, the horizontal driver transistor. The signal is amplified and coupled to the base circuit of TS7460, the horizontal output transistor. This will drive the line output transformer (LOT) and associated circuit. The LOT provides the extra high voltage (EHT), the VG2 voltage and the focus and filament voltages for the CRT, while the line output circuit drives the horizontal deflection coil.

9.5.2 Vertical Drive

A divider circuit performs the vertical synchronisation. The vertical ramp generator needs an external resistor (R3245, pin 20) and capacitor (C2244, pin 21). A differential output is available at pins 16 and 17, which are DC-coupled with the vertical output stage.
During the insertion of RGB signals, the maximum vertical frequency is increased to 72 Hz so that the circuit can also synchronise on signals with a higher vertical frequency like VGA.
To avoid damage of the picture tube when the vertical deflection fails, the guard output is fed to the beam current limiting input. When a failure is detected, the RGB-outputs are blanked. When no vertical deflection output stage is connected, this guard circuit will also blank the output signals.

These 'V_DRIVE+' and 'V_DRIVE-' signals are applied to the input pins 1 and 2 of IC7471 (full bridge vertical deflection amplifier). These are voltage driven differential inputs. As the driver device (IC7200) delivers output currents, R3474 and R3475 convert them to voltage. The differential input voltage is compared with the voltage across measuring resistor R3471 that provides internal feedback information. The voltage across this measuring resistor is proportional to the output current, which is available at pins 4 and 7 where they drive the vertical deflection coil (connector 0222) in phase opposition.
IC7471 is supplied by +13 V. The vertical flyback voltage is determined by an external supply voltage at pin 6 (VlotAux+50V). This voltage is almost totally available as flyback voltage across the coil, this being possible due to the absence of a coupling capacitor (which is not necessary, due to the 'bridge' configuration).

9.5.3 Deflection Corrections

The Linearity Correction
A constant voltage on the horizontal deflection coil should result in a sawtooth current. This however is not the case as the resistance of the coil is not negligible. In order to compensate for this resistance, a pre-magnetised coil L5457 is used. R3485 and C2459 ensure that L5457 does not excite, because of its own parasite capacitance. This L5457 is called the 'linearity coil'.

The Mannheim Effect
When clear white lines are displayed, the high-voltage circuit is heavily loaded. During the first half of the flyback, the high voltage capacitors are considerable charged. At that point in time, the deflection coil excites through C2465. This current peak, through the high-voltage capacitor, distorts the flyback pulse. This causes synchronisation errors, causing an oscillation under the white line.
During t3 - t5, C2490//2458 is charged via R3459. At the moment of the flyback, C2490//2458 is subjected to the negative voltage pulses of the parabola as a result of which D6465 and D6466 are conducting and C2490//2458 is switched in parallel with C2456//2457. This is the moment the high-voltage diodes are conducting. Now extra energy is available for excitation through C2465 and the line deflection. As a consequence, the flyback pulse is less distorted.

The S-Correction
Since the sides of the picture are further away from the point of deflection than from the centre, a linear sawtooth current would result in a non-linear image being scanned (the centre would be scanned slower than the sides). For the centre-horizontal line, the difference in relation of the distances is larger then those for the top and bottom lines. An S-shaped current will have to be superimposed onto the sawtooth current. This correction is called finger-length correction or S-correction. C2456//2457 is relatively small, as a result of which the sawtooth current will generate a parabolic voltage with negative voltage peaks. Left and right, the voltage across the deflection coil decreases, and the deflection will slow down; in the centre, the voltage increases and deflection is faster. The larger the picture width, the higher the deflection current through C2456//2457. The current also results in a parabolic voltage across C2484//2469, resulting in the finger length correction proportionally increasing with the picture width. The east/west drive signal will ensure the largest picture width in the centre of the frame. Here the largest correction is applied.

East/West Correction
In the L01, there are three types of CRTs, namely the 100º, 110º and wide screen CRTs. The 100º CRT is raster-correction-free and does not need East/West correction.
The 110º 4:3 CRT comes with East/West correction and East/West protection.
The wide screen TV sets have all the correction of the 110 4:3 CRT and also have additional picture format like the 4:3 format, 16:9, 14:9, 16:9 zoom, subtitle zoom and the Super-Wide picture format

A line, written at the upper- or lower side of the screen, will be larger at the screen centre when a fixed deflection current is used. Therefore, the amplitude of the deflection current must be increased when the spot approaches the centre of the screen. This is called the East/West or pincushion correction.

The 'Ewdrive' signal from pin 15 of IC7200 takes care for the correct correction. It drives FET TS7400. It also corrects breathing of the picture, due to beam current variations (the EHT varies dependent of the beam current). This correction is derived from the 'EHTinformation' line.
Two protections are built-in for the E/W circuit: over-current and over-voltage protection. See paragraph Power Supply.

Panorama (if present)
The panorama function is only used in 16:9 sets. This is a function to enable the 4:3 and Super-Wide feature. It drives the 'Bass_panorama' line, to activate relay 1400. When this relay is switched on, the capacitors 2453//2454 are added in parallel to the default S-correction capacitors 2456//2457. This results in an increased capacitance, a lower resonance frequency of the line deflection coil and the S-correction capacitors and therefore a less steep S-corrected line deflection current.

9.5.4 Rotation (if present)

To cope with the different earth magnetism situations in the world, a rotation coil is added. This coil is controlled by the rotation circuitry (see diagram A15).
The amount of frame rotation is user controlled via the the PWM output (pin 77) of the UOC.
With the tilt setting at '-10', the PWM duty cycle is 0.1 (leftmost tuning).
With the setting at '+10', the duty cycle is 0.9 (rightmost tuning).
The output of amplifier IC7171 is a DC-voltage in the range from 0 (user setting = -10), via 6 V (user setting = 0) to 12 V (user setting = +10).

9.6 Power Supply

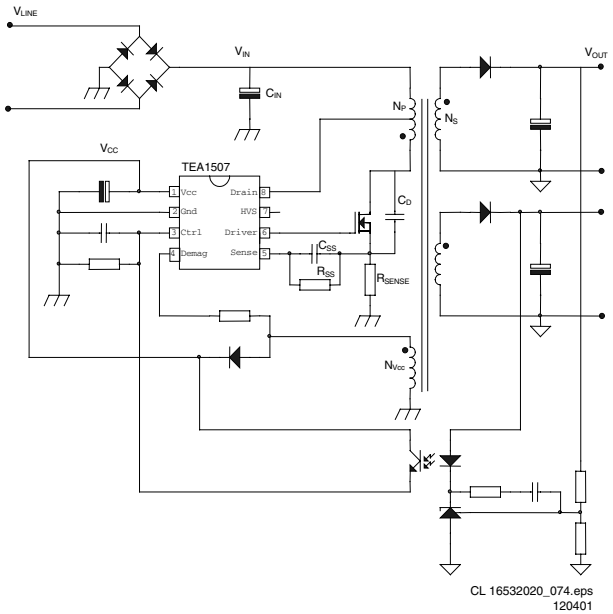


Figure 9-6

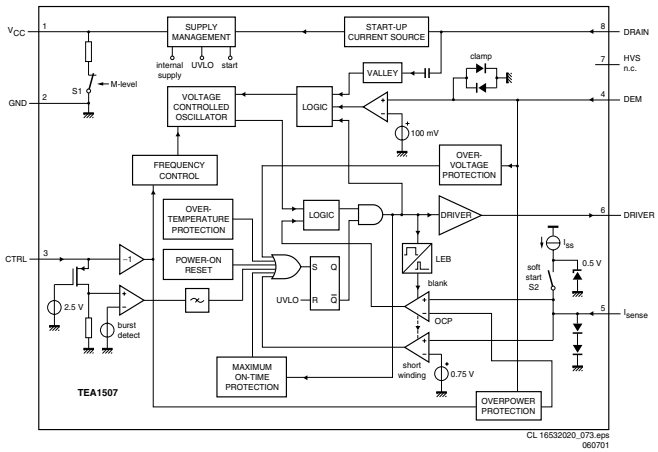


Figure 9-7

9.6.1 Introduction

The supply is a Switching Mode Power Supply (SMPS). The frequency of operation varies with the circuit load. This 'Quasi-Resonant Flyback' behaviour has some important benefits compared to a 'hard switching' fixed frequency Flyback converter. The efficiency can be improved up to 90%, which results in lower power consumption. Moreover the supply runs cooler and safety is enhanced.
The power supply starts operating when a DC voltage goes from the rectifier bridge via T5520, R3532 to pin 8. The operating voltage for the driver circuit is also taken from the 'hot' side of this transformer.
The switching regulator IC7520 starts switching the FET 'on' and 'off', to control the current flow through the primary winding of transformer 5520. The energy stored in the primary winding during the 'on' time is delivered to the secondary windings during the 'off' time.
The 'MainSupply' line is the reference voltage for the power supply. It is sampled by resistors 3543 and 3544 and fed to the input of the regulator 7540/6540. This regulator drives the feedback optocoupler 7515 to set the feedback control voltage on pin 3 of 7520.
The power supply in the set is 'on' any time AC power goes to the set.

Derived Voltages
The voltages supplied by the secondary windings of T5520 are:
- 'MainAux' for the audio circuit (voltage depends on set execution, see table below),
- 3.3 V and 3.9 V for the microprocessor and
- 'MainSupply' for the horizontal output (voltage depends on set execution, see table below).

Other supply voltages are provided by the LOT. It supplies +50 V (only for large screen sets), +13 V, +8 V, +5 V and a +200 V source for the video drive. The secondary voltages of the LOT are monitored by the 'EHTinformation' lines. These lines are fed to the video processor part of the UOC IC7200 on pins 11 and 34.
This circuit will shut 'off' the horizontal drive in case of over-voltage or excessive beam current.

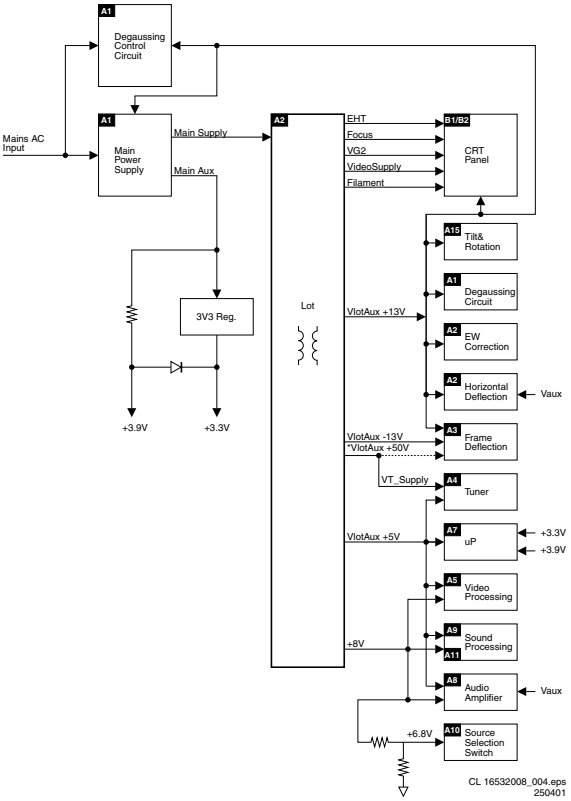


Figure 9-8

Power supply voltages L01				
Screen Size	**Voltage name**	**Meas. point**	**Value**	**Remark**
14", 17", 20", 21"	MainSupply	P6 (C2561)	95 V	
	MainAux	P5 (C2564)	11 V	Stereo 2x3 W and Mono 1x2 W, 3 W, 4 W
			10 V	Stereo 2x1 W and Mono 1x1 W
All others	MainSupply	P6 (C2561)	130 V	21/25/29RF and 25/27/32/35V
			143 V	25/28/29SF, 25/28BLD, 25/28BLS, 28/32WS, 24/28BLDWS & BLSWS
	MainAux	P5 (C2564)	12 V	Stereo 2x1 W, 3 W, 5 W
			10 V	Mono 1x1 W

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Figure 9-9

Degaussing

When the set is switched on, the degaussing relay 1515 is immediately activated as transistor 7580 is conducting. Due to the RC-time of R3580 and C2580, it will last about 3 to 4 seconds before transistor 7580 is switched off.

9.6.2 Basic IC Functionality

For a clear understanding of the Quasi-Resonant behaviour, it is possible to explain it by a simplified circuit diagram (see Figure below). In this circuit diagram, the secondary side is transferred to the primary side and the transformer is replaced by an inductance L_P. C_D is the total drain capacitance including the resonance capacitor C_R, parasitic output capacitor C_{OSS} of the MOSFET and the winding capacitance C_W of the transformer. The turns ratio of the transformer is represented by n (N_P/N_S).

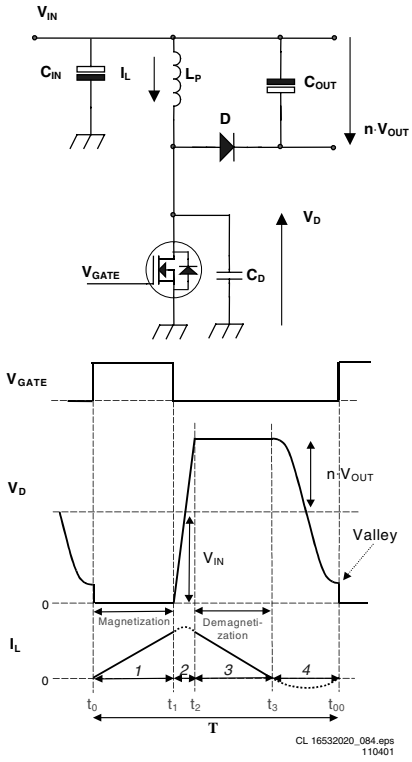


Figure 9-10

In the Quasi-Resonant mode each period can be divided into four different time intervals, in chronological order:

- Interval 1: t0 < t < t1 primary stroke At the beginning of the first interval, the MOSFET is switched 'on' and energy is stored in the primary inductance (magnetisation). At the end, the MOSFET is switched 'off' and the second interval starts.
- Interval 2: t1 < t < t2 commutation time In the second interval, the drain voltage will rise from almost zero to $V_{IN}+n•(V_{OUT}+V_F)$. V_F is the forward voltage drop of de diode that will be omitted from the equations from now on. The current will change its positive derivative, corresponding to V_{IN}/L_P, to a negative derivative, corresponding to $-n•V_{OUT}/L_P$.
- Interval 3: t2 < t < t3 secondary stroke In the third interval, the stored energy is transferred to the output, so the diode starts to conduct and the inductive current I_L will decrease. In other words, the transformer will be demagnetised. When the inductive current has become zero the next interval begins.
- Interval 4: t3 < t < t00 resonance time In the fourth interval, the energy stored in the drain capacitor C_D will start to resonate with the inductance L_P. The voltage and current waveforms are sinusoidal waveforms. The drain voltage will drop from $V_{IN}+n•V_{OUT}$ to $V_{IN}-n•V_{OUT}$.

Frequency Behaviour

The frequency in the QR-mode is determined by the power stage and is not influenced by the controller (important parameters are L_P and C_D). The frequency varies with the input voltage V_{IN} and the output power P_{OUT}. If the required output power increases, more energy has to be stored in the transformer. This leads to longer magnetising t_{PRIM} and demagnetising t_{SEC} times, which will decrease the frequency. See the frequency versus output power characteristics below. The frequency characteristic is not only output power-, but also input voltage dependent. The higher the input voltage, the smaller t_{PRIM}, so the higher the frequency will be.

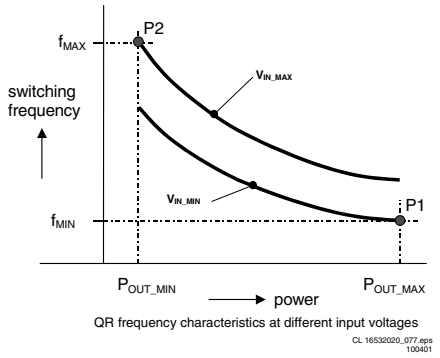


Figure 9-11

Point P1 is the minimum frequency f_{MIN} that occurs at the specified minimum input voltage and maximum output power required by the application. Of course the minimum frequency has to be chosen above the audible limit (>20 kHz).

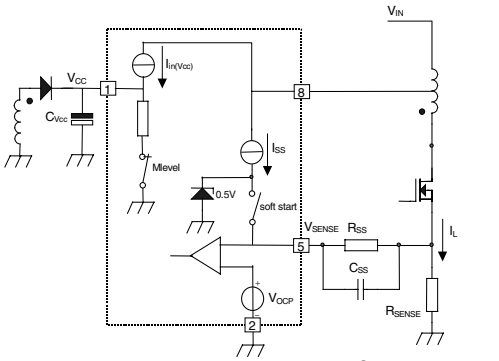
Start-up Sequence

When the rectified AC voltage V_{IN} (via the centre tap connected to pin 8) reaches the Mains dependent operation level (Mlevel: between 60 and 100 V), the internal 'Mlevel switch' will be opened and the start-up current source is enabled to charge capacitor C2521 at the V_{CC} pin as shown below.

The 'soft start' switch is closed when the V_{CC} reaches a level of 7 V and the 'soft start' capacitor C_{SS} (C2522, between pin 5 and the sense resistor R3526), is charged to 0.5 V.

Once the V_{CC} capacitor is charged to the start-up voltage $V_{CC\text{-}start}$ (11 V), the IC starts driving the MOSFET. Both internal current sources are switched 'off' after reaching this start-up voltage. Resistor R_{SS} (3524) will discharge the 'soft start' capacitor, such that the peak current will slowly increase. This to prevent 'transformer rattle'.

During start-up, the V_{CC} capacitor will be discharged until the moment that the primary auxiliary winding takes over this voltage.



Start-up sequence

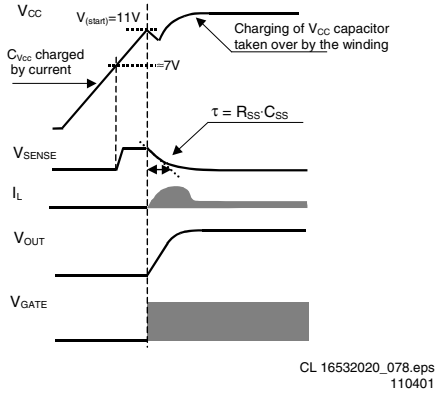


Figure 9-12

The moment that the voltage on pin 1 drops below the 'under voltage lock out' level (UVLO = ± 9 V), the IC will stop switching and will enter a safe restart from the rectified mains voltage.

Operation

The supply can run in three different modes depending on the output power:

- Quasi-Resonant mode (QR) The QR mode, described above, is used during normal operation. This will give a high efficiency.
- Frequency Reduction mode (FR) The FR mode (also called VCO mode) is implemented to decrease the switching losses at low output loads. In this way the efficiency at low output powers is increased, which enables power consumption smaller than 3 W during stand-by. The voltage at the pin 3 (Ctrl) determines where the frequency reduction starts. An external Ctrl voltage of 1.425 V corresponds with an internal VCO level of 75 mV. This fixed VCO level is called $V_{VCO,start}$. The frequency will be reduced in relation to the VCO voltage between 75 mV and 50 mV (at levels larger than 75 mV, Ctrl voltage < 1.425V, the oscillator will run on maximum frequency f_{oscH} = 175 kHz typically). At 50 mV ($V_{VCO,max}$) the frequency is reduced to the minimum level of 6 kHz. Valley switching is still active in this mode.
- Minimum Frequency mode (MinF) At VCO levels below 50 mV, the minimum frequency will remain on 6 kHz, which is called the MinF mode. Because of this low frequency, it is possible to run at very low loads without having any output regulation problems.

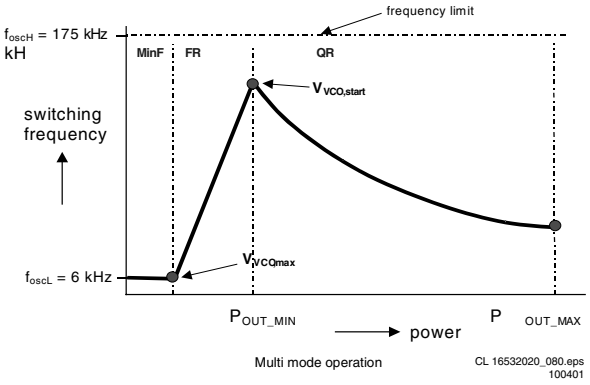


Figure 9-13

Safe-Restart Mode

This mode is introduced to prevent the components from being destroyed during eventual system fault conditions. It is also used for the Burst mode. The Safe-Restart mode will be entered if it is triggered by one of the following functions:

- Over voltage protection,
- Short winding protection,
- Maximum 'on time' protection,
- V_{CC} reaching UVLO level (fold back during overload),
- Detecting a pulse for Burst mode,
- Over temperature protection.

When entering the Safe-Restart mode, the output driver is immediately disabled and latched. The V_{CC} winding will not charge the V_{CC} capacitor anymore and the V_{CC} voltage will drop until UVLO is reached. To recharge the V_{CC} capacitor, the internal current source ($I_{(restart)(VCC)}$) will be switched 'on' to initiate a new start-up sequence as described before. This Safe-Restart mode will persist until the controller detects no faults or burst triggers.

Standby

The set goes to Standby in the following cases:

- After pressing the 'standby' key on the remote control.
- When the set is in protection mode.

In Standby, the power supply works in 'burst mode'.
Burst mode can be used to reduce the power consumption below 1 W at stand-by. During this mode, the controller is active (generating gate pulses) for only a short time and for a longer time inactive waiting for the next burst cycle.
In the active period the energy is transferred to the secondary and stored in the buffer capacitor C_{STAB} in front of the linear stabiliser (see Figure below). During the inactive period, the load (e.g. microprocessor) discharges this capacitor. In this mode, the controller makes use of the Safe-Restart mode.

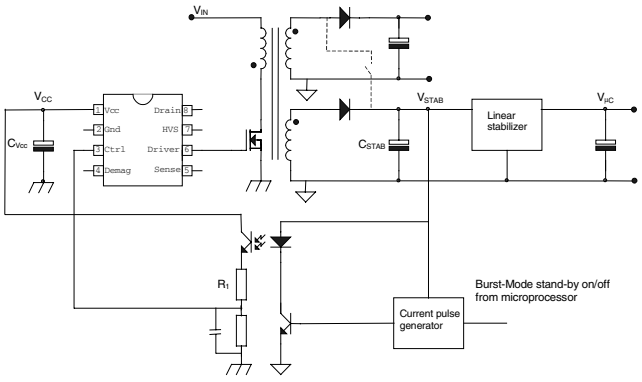


Figure 9-14

The system enters burst mode standby when the microprocessor activates the 'Stdby_con' line. When this line is pulled high, the base of TS7541 is allowed to go high. This is triggered by the current from collector TS7542. When TS7541 turns 'on', the opto-coupler (7515) is activated, sending a large current signal to pin 3 (Ctrl). In response to this signal, the IC stops switching and enters a 'hiccup' mode. This burst activation signal should be present for longer than the 'burst blank' period (typically 30 µs): the blanking time prevents false burst triggering due to spikes.
Burst mode standby operation continues until the microcontroller pulls the 'Stdby_con' signal low again. The base of TS7541 is unable to go high, thus cannot turn 'on'. This will disable the burst mode. The system then enters the start-up sequence and begins normal switching behaviour.

For a more detailed description of one burst cycle, three time intervals are defined:

- t1: Discharge of V_{CC} when gate drive is active During the first interval, energy is transferred, which result in a ramp-up of the output voltage (V_{STAB}) in front of the stabiliser. When enough energy is stored in the capacitor, the IC will be switched 'off' by a current pulse generated at the secondary side. This pulse is transferred to the primary side via the opto coupler. The controller will disable the output driver (safe restart mode) when the current pulse reaches a threshold level of 16 mA into the Ctrl pin. A resistor R_1 (R3519) is placed in series with the opto coupler, to limit the current going into the Ctrl pin. Meanwhile the V_{CC} capacitor is discharged but has to stay above V_{UVLO} .
- t2: Discharge of V_{CC} when gate drive is inactive During the second interval, the V_{CC} is discharged to V_{UVLO}. The output voltage will decrease depending on the load.
- t3: Charge of V_{CC} when gate drive is inactive The third interval starts when the UVLO is reached. The internal current source charges the V_{CC} capacitor (also the soft start capacitor is recharged). Once the V_{CC} capacitor is charged to the start-up voltage, the driver is activated and a new burst cycle is started.

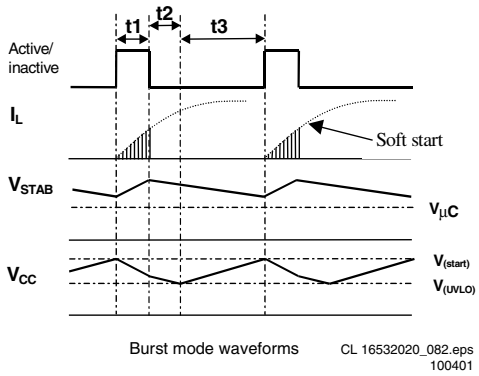


Figure 9-15

9.6.3 Protection Events

The SMPS IC7520 has the following protection features:

Demagnetisation sense
This feature guarantees discontinuous conduction mode operation in every situation. The oscillator will not start a new primary stroke until the secondary stroke has ended. This is to ensure that FET 7521 will not turn on until the demagnetisation of transformer 5520 is completed. The function is an additional protection feature against:

- saturation of the transformer,
- damage of the components during initial start-up,
- an overload of the output.

The demag(netisation) sense is realised by an internal circuit that guards the voltage (Vdemag) at pin 4 that is connected to V_{CC} winding by resistor R_1 (R3522). The Figure below shows the circuit and the idealised waveforms across this winding.

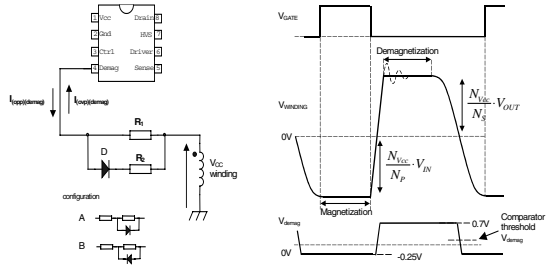


Figure 9-16

Over Voltage Protection
The Over Voltage Protection ensures that the output voltage will remain below an adjustable level. This works by sensing the auxiliary voltage via the current flowing into pin 4 (DEM) during the secondary stroke. This voltage is a well-defined replica of the output voltage. Any voltage spikes are averaged by an internal filter.
If the output voltage exceeds the OVP trip level, the OVP circuit switches the power MOSFET 'off'.
Next, the controller waits until the 'under voltage lock out' level (UVLO = ± 9 V) is reached on pin 1 (V_{CC}). This is followed by a safe restart cycle, after which switching starts again. This process is repeated as long as the OVP condition exists. The output voltage, at which the OVP function trips, is set by the demagnetisation resistor R3522.

Over Current Protection
The internal OCP protection circuit limits the 'sense' voltage on pin 5 to an internal level.

Over Power Protection
During the primary stroke, the rectified AC input voltage is measured by sensing the current drawn from pin 4 (DEM). This current is dependent on the voltage on pin 9 of transformer 5520 and the value of R3522. The current information is used to adjust the peak drain current, which is measured via pin I_{SENSE}.

Short Winding Protection
If the 'sense' voltage on pin 5 exceeds the short winding protection voltage (0.75 V), the converter will stop switching. Once V_{CC} drops below the UVLO level, capacitor C2521 will be recharged and the supply will start again. This cycle will be repeated until the short circuit is removed (safe restart mode). The short winding protection will also protect in case of a secondary diode short circuit.
This protection circuit is activated after the leading edge blanking time (LEB).

LEB time
The LEB (Leading Edge Blanking) time is an internally fixed delay, preventing false triggering of the comparator due to current spikes. This delay determines the minimum 'on' time of the controller.

Over Temperature protection
When the junction temperature exceeds the thermal shutdown temperature (typ. 140º C), the IC will disable the driver. When the V_{CC} voltage drops to UVLO, the V_{CC} capacitor will be recharged to the $V_{(start)}$ level. If the temperature is still too high, the V_{CC} voltage will drop again to the UVLO level (Safe-Restart mode). This mode will persist until the junction temperature drops 8 degrees typically below the shutdown temperature.

Mains dependent operation enabling level
To prevent the supply from starting at a low input voltage, which could cause audible noise, a mains detection is implemented (Mlevel). This detection is provided via pin 8, that detects the minimum start-up voltage between 60 and 100 V. As previous mentioned, the controller is enabled between 60 and 100 V. An additional advantage of this function is the protection against a disconnected buffer capacitor (C_{IN}). In this case, the supply will not be able to start-up because the V_{CC} capacitor will not be charged to the start-up voltage.

9.7 Control

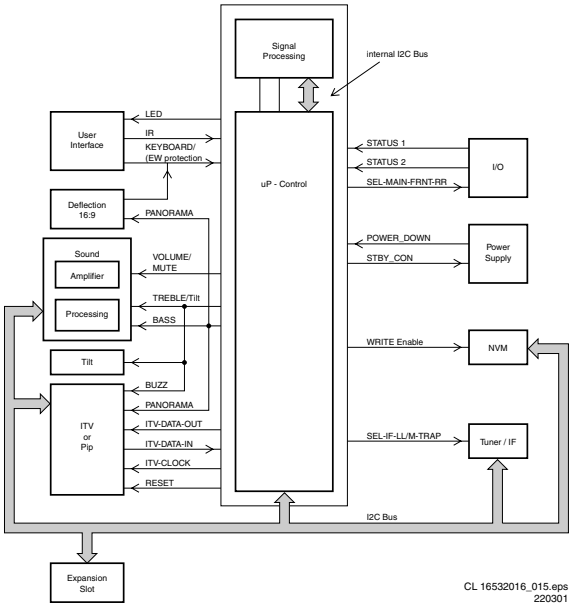


Figure 9-17

9.7.1 Introduction

The microprocessor part of the UOC, has the complete control and teletext on board. User menu, Service Default Mode, Service Alignment Mode and Customer Service Mode are generated by the µP. Communication to other ICs is done via the I^2C-bus.

9.7.2 I^2C-Bus

The main control system, which consists of the microprocessor part of the UOC (7200), is linked to the external devices (tuner, NVM, MSP, etc) by means of the I^2C-bus. An internal I^2C-bus is used to control other signal processing functions, like video processing, sound IF, vision IF, synchronisation, etc.

9.7.3 User Interface

There are two control signals, called 'KEYBOARD_protn' and 'IR'. Users can interact either through the Remote Control transmitter, or by activation of the appropriate keyboard buttons.
The L01 uses a remote control with RC5 protocol. The incoming signal is connected to pin 67 of the UOC.
The 'Top Control' keyboard, connected to UOC pin 80, can also control the set. Button recognition is done via a voltage divider. The 'KEYBOARD_protn' line, also serves to detect faults in the E/W circuit, which would require the µP to shut down the set (by forcing the power supply in standby mode).

The front LED (6691) is connected to an output control line of the microprocessor (pin 5). It is activated to provide the user information about whether or not the set is working correctly (e.g., responding to the remote control or fault condition)

9.7.4 Sound Interface

There are three control signals, called 'Volume_Mute', 'Treble_Buzzer_Hosp_app' and 'Bass_panorama'.
The 'Volume_Mute' line controls the sound level output of the audio amplifier or to mute it in case of no video identification or from user command. This line also controls the volume level during set switch 'on' and 'off' (to prevent audio plop).
The 'Treble' and 'Bass' lines are used (in mono 4:3 sets) to switch between different smart sound modes. For other set executions (e.g. stereo, widescreen), they have another functionality:

– The 'Bass_panorama' line is used to switch the panorama mode in widescreen sets (to fit 4:3 pictures into a 16:9 display, it is possible to apply a panoramic horizontal distortion, to make a screen-fitting picture without black sidebars or lost video).
– The 'Treble_Buzzer_Hosp_app' is used in ITV applications for other feautures, and in widescreen sets to enable the 'Tilt' feature (via R3172 on diagram A8) in the deflection part.

9.7.5 In- and Output Selection

For the control of the input and output selections, there are three lines:

- **STATUS1** This signal provides information to the microprocessor on whether a video signal is available on the SCART1 AV input and output port (only for Europe). This signal is not connected in NAFTA sets.
- **STATUS2** This signal provides information to the microprocessor on whether a video signal is available on the SCART2 AV input and output port (only for Europe). For sets with an SVHS input it provides the additional information if a Y/C or CVBS source is present. The presence of an external Y/C source makes this line 'high' while a CVBS source makes the line 'low'.

- **SEL-MAIN-FRNT-RR** This is the source select control signal from the microprocessor. This control line is under user control or can be activated by the other two control lines.

9.7.6 Power Supply Control

The microprocessor part is supplied with 3.3 V and 3.9 V both derived from the 'MainAux' voltage via a 3V3 stabiliser (7560) and a diode.
Two signals are used to control the power supply:

- **Stdby_con** This signal is generated by the microprocessor when over-current takes place at the 'MainAux' line. This is done to enable the power supply into standby burst mode, and to enable this mode during a protection. This signal is 'low' under normal operation conditions and goes to 'high' (3.3 V) under 'standby' and 'fault' conditions.
- **POWER_DOWN** This signal is generated by the power supply. Under normal operating conditions this signal is 'high' (3.3 V). During 'standby' mode, this signal is a pulse train of approx. 10 Hz and a 'high' duration of 5 ms. It is used to give information to the UOC about the fault condition in the Audio amplifier supply circuit. This information is generated by sensing the current on the 'MainAux' line (using voltage drop across R3564 to trigger TS7562). This signal goes 'low' when the DC-current on the 'MainAux' line exceeds 1.6 - 2.0 A. It is also used to give an early warning to the UOC about a power failure. Then the information is used to mute the sound amplifier to prevent a switch off noise and to solve the switch-off spot.

9.7.7 Tuner IF

Pin 3 of the UOC (SEL-IF-LL'_M-TRAP), is an output pin to switch the SAW-filter to the appropriate system.

- If UOC pin 3 is 'low', the selected system is:
  - West Europe: PAL B/G, I, SECAM L/L'
  - East Europe: PAL B/G
  - Asia Pacific: NTSC M
- If UOC pin 3 is 'high', the selected system is:
  - West Europe: SECAM L', L'-NICAM
  - East Europe: PAL D/K
  - Asia Pacific: PAL B/G, D/K, I

9.7.8 Protection Events

Several protection events are controlled by the UOC:

- **BC protection**, to protect the picture tube from a too high beam current. The UOC has the capability of measuring the normal back level current during the vertical flyback. So if for some reason the CRT circuit is malfunctioning (i.e. high beam current), the normal black current will be out of the 75 μA range, and the UOC will trigger the power supply to shut down. However, this is a high beam-current situation, the TV screen will be bright white before the set is shut down.
- **E/W protection**, two protection mechanisms are built in, over-current and over-voltage.
  - In case of over-current due to defective parts in the line deflection output stage, a high current will flow through resistors 3405//3406. If this current is large enough to create a voltage drop of 0.7 V across 3405//3406, transistor TS7606 (in A7 diagram) will conduct and pin 80 of the UOC will be pulled down. Thereafter, the UOC will shut down the power supply. In case of further current increase, the fused resistor 3411 is built-in for double protection.
  - In case of a high voltage appearing across capacitor 2401 (dependent of the tube size), which is high enough to trigger zener diode 6401 into conduction, transistor TS7606 (in A7 diagram) will conduct and UOC is triggered to shut down the power supply.
- **I2C protection**, to check whether all I^2C IC's are functioning.

In case one of these protections is activated, the set will go into 'standby'.

The 'on' and 'standby' LEDs are controlled via the UOC.

9.8 Abbreviation list

2CS	2 Carrier (or Channel) Stereo
ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ATS	Automatic Tuning System
AV	External Audio Video
AVL	Automatic Volume Level
BC-PROT	Beam Current Protection
BCL	Beam Current Limitation
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BLC-INFORMATION	Black current information
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue teletext
CC	Closed Caption
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Colour Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronisation
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DBX	Dynamic Bass Expander
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Direction For Use: description for the end user
DNR	Dynamic Noise Reduction
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EHT-INFORMATION	Extra High Tension information
EU	Europe
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or Cinch
FBL	Fast Blanking: DC signal accompanying RGB signals
FILAMENT	Filament of CRT
FLASH	Flash memory

FM	Field Memory
FM	Frequency Modulation
HA	Horizontal Acquisition: horizontal sync pulse coming out of the HIP
HFB	Horizontal Flyback Pulse: horizontal sync pulse from large signal deflection
HP	Headphone
Hue	Colour phase control for NTSC (not the same as 'Tint')
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
IF	Intermediate Frequency
IIC	Integrated IC bus
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker.
ITV	Institutional TV
LATAM	Latin America
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LNA	Low Noise Amplifier
LS	Large Screen
LS	Loudspeaker
LSP	Large signal panel
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MSP	Multi-standard Sound Processor: ITT sound decoder
MUTE	Mute-Line
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTSC	National Television Standard Committee. Colour system mainly used in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OB	Option Byte
OC	Open Circuit
OSD	On Screen Display
PAL	Phase Alternating Line. Colour system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit board
PIP	Picture In Picture
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power-On Reset
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PTP	Picture Tube Panel (or CRT-panel)
RAM	Random Access Memory
RC	Remote Control handset
RC5	Remote Control system 5, signal from the remote control receiver
RGB	Red Green Blue
ROM	Read Only Memory
SAM	Service Alignment Mode
SAP	Second Audio Program
SC	Sandcastle: pulse derived from sync signals
S/C	Short Circuit
SCAVEM	Scan Velocity Modulation
SCL	Serial Clock
SDA	Serial Data
SDM	Service Default Mode
SECAM	SEequence Couleur Avec Memoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SS	Small Screen
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
TXT	Teletext
µP	Microprocessor
UOC	Ultimate One Chip
VA	Vertical Acquisition
VBAT	Main supply voltage for the deflection stage (mostly 141 V)
V-chip	Violence Chip
VCR	Video Cassette Recorder
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YC	Luminance (Y) and Chrominance (C) signal

10. Spare Parts List

Mono Carrier [A]

Various

0127▲	4822 265 11253	FUSE HOLDER 2P
0129	3139 120 10151	NTC HOLDER
0136	4822 492 70788	FIX IC
0137	4822 492 70289	
0138	4822 492 70788	FIX IC
0140	4822 492 70289	
0141	4822 492 70788	FIX IC
0152	3139 121 08841	CABLE 6-400
0211▲	2422 025 16374	CON 2P Male
0211▲	4822 265 20723	B2P3-VH
0212▲	4822 267 10774	2P MALE
0219	2422 025 12482	CON 6P Male
0220	4822 265 30735	CON 5P
0221▲	4822 267 10966	CON 2P
0222▲	2422 025 10646	CON 2P Male
0223	2422 026 05184	CINCH 6P Female
0231▲	2422 128 02972	SWI POW 2P 128A
0240	2422 025 11244	CON 7P Male
0243	2422 025 04854	CON 6P Female
0244	4822 265 30735	CON 5P
0245	2422 025 04854	CON 6P Female
0246	4822 267 10734	B5B-EH-A
0251	4822 267 10565	4P
0254▲	2422 500 80067	CON CRT 9P F N-NECK
0259	2422 025 16387	CON 5P Male
0262	2422 025 16937	CON 3P Female
0267	4822 267 10735	B3B-EH-A
1000▲	2422 542 90111	TUN V+U PLL
1000▲	2422 542 90122	TUN V+U PLL
1002	2422 549 44722	FIL SAW 38MHz OFWK7257M
1004	2422 549 44719	FIL SAW 38MHz OFWK9362M
1200	4822 242 81572	TPS6,0MB-TF21
1500▲	2422 086 10914	FUSE 4A 250V
1515▲	2422 132 07444	RELAY 1P 12V 5A
1600	4822 276 13775	SWITCH
1601	4822 276 13775	SWITCH
1602	4822 276 13775	SWITCH
1603	4822 276 13775	SWITCH
1660	2422 543 01203	XTL 12MHz
1831	4822 242 10769	18.432MHz

⊣⊢

2003	4822 122 33177	10nF 20% 50V
2004	4822 126 13751	47nF 10% 63V
2005	4822 124 40248	10µF 20% 63V
2006	4822 124 80791	470µF 20% 16V
2007	4822 126 14585	100nF 10% 50V
2008	4822 124 40207	100µF 20% 25V
2009	5322 122 32654	22nF 10% 63V
2101	4822 126 13482	470nF 20% 16V
2102	5322 122 32658	22pF 5% 50V
2103	5322 122 31863	330pF 5% 63V
2104	5322 122 31863	330pF 5% 63V
2105	4822 124 40248	10µF 20% 63V
2106	4822 124 40248	10µF 20% 63V
2121	5322 122 32658	22pF 5% 50V
2122	5322 122 31863	330pF 5% 63V
2123	4822 126 14491	2.2µF 10V
2124	5322 122 31863	330pF 5% 63V
2125	4822 126 14491	2.2µF 10V
2135	5322 122 32658	22pF 5% 50V
2136	5322 122 32658	22pF 5% 50V
2181	5322 122 32658	22pF 5% 50V
2184	4822 126 14491	2.2µF 10V
2201	4822 126 14585	100nF 10% 50V
2202	4822 126 14585	100nF 10% 50V
2203	4822 126 14585	100nF 10% 50V
2204	4822 126 14585	100nF 10% 50V
2205	4822 126 14076	220nF 25V
2208	4822 126 14585	100nF 10% 50V
2209	4822 124 40769	4.7µF 20% 100V
2210	4822 124 21913	1µF 20% 63V
2211	4822 126 13482	470nF 20% 16V
2213	5322 122 32654	22nF 10% 63V
2214	5322 122 32654	22nF 10% 63V
2215	5322 122 32654	22nF 10% 63V
2216	4822 124 81144	1000µF 16V
2217	5322 122 32654	22nF 10% 63V
2219	4822 126 14076	220nF 25V
2220	4822 121 51252	470nF 5% 63V
2221	5322 122 32654	22nF 10% 63V
2226	5322 126 10465	3.9nF 10% 50V
2227	4822 122 32614	1N2 10% 63V
2228	5322 122 31863	330pF 5% 63V
2229	4822 124 40248	10µF 20% 63V
2230	4822 124 40769	4.7µF 20% 100V
2241	4822 126 13344	1.5nF 5% 63V
2242	4822 126 14043	1µF 20% 16V
2243	4822 122 33127	2.2nF 10% 63V
2244	5322 121 42386	100nF 5% 63V
2245	4822 126 14076	220nF 25V
2247	4822 124 81144	1000µF 16V
2248	5322 122 32654	22nF 10% 63V
2249	5322 122 32654	22nF 10% 63V
2250	4822 124 22652	2.2µF 20% 50V
2252	5322 126 10511	1nF 5% 50V
2253	5322 126 10511	1nF 5% 50V
2254	4822 051 20008	JUMP
2330	4822 121 51473	470nF 20% 63V
2340	4822 124 11565	10µF 20% 250V
2341▲	4822 126 13599	3.3nF 10% 500V
2342	5322 122 31647	1nF 10% 63V
2343▲	4822 126 12278	3300pF 10% 2KV
2344	4822 126 14585	100nF 10% 50V
2345▲	4822 122 31175	1nF 10% 500V
2401	5322 124 41379	2.2µF 20% 50V
2402▲	4822 122 31177	470pF 10% 500V
2404	4822 124 41751	47µF 20% 50V
2405	5322 126 10511	1nF 5% 50V
2441	4822 124 21913	1µF 20% 63V
2443	4822 126 13751	47nF 10% 63V
2444	4822 124 21913	1µF 20% 63V
2450	4822 124 11575	47µF 20% 160V
2452	4822 126 10326	180pF 5% 63V
2455	4822 124 40433	47µF 20% 25V
2457▲	2222 479 90016	270nF 5% 250V
2457▲	4822 121 10518	390nF 5% 250V
2457▲	4822 121 43888	360nF 5% 250V
2458	4822 124 12438	2.2µF 20% 100V
2459▲	4822 126 13185	680pF 10% 500V
2460	5322 122 32531	100pF 5% 50V
2463▲	4822 126 13451	2.2nF 10% 2KV
2463▲	4822 126 13862	1.5nF 10% 2KV
2464	4822 121 10739	2.2µF 5% 160V
2465▲	2222 375 24153	15nF 5% 1KV
2465▲	4822 121 70649	9.1nF 5% 1.6KV
2467	2222 347 90219	15nF 10% 400V
2467	4822 121 40488	22nF 10% 400V
2467	5322 121 42532	18nF 10% 400V
2468	2222 347 90219	15nF 10% 400V
2468	4822 121 40488	22nF 10% 400V
2468	5322 121 42532	18nF 10% 400V
2471	5322 121 42386	100nF 5% 63V
2472	4822 121 41854	150nF 5% 63V
2473	5322 121 42386	100nF 5% 63V
2474	4822 122 33127	2.2nF 10% 63V
2475	4822 122 33127	2.2nF 10% 63V
2476	5322 126 10223	4.7nF 10% 63V
2480	5322 121 10472	47µF /25
2481▲	4822 122 31177	470pF 10% 500V
2482	2222 479 90051	120nF 5% 250V
2482	4822 121 40482	68nF 10% 250V
2485	4822 124 12265	4.7µF 20% 250V
2486	2020 021 91577	470µF 20% 16V
2487	4822 124 80604	47µF 20% 50V
2488	4822 124 81145	1000µF 20% 16V
2489	2020 021 91577	470µF 20% 16V
2491	4822 122 31175	1nF 10% 500V
2500▲	4822 126 13589	470nF 275V
2501▲	4822 126 14153	2.2nF 10% 1KV
2502▲	4822 126 14153	2.2nF 10% 1KV
2503	4822 124 12415	220µF 20% 400V
2503	4822 124 12442	330µF 20% 450V
2503	4822 124 42159	330µF 20% 400V
2505▲	4822 126 14153	2.2nF 10% 1KV
2507	5322 122 34099	470pF 10% 63V
2508	4822 122 50116	470pF 10% 1KV
2509	4822 121 10711	100nF 20% 275V
2515▲	4822 126 14049	1.5nF 20% 250V
2516▲	4822 126 13867	330P 20% 250V
2520	4822 126 14585	100nF 10% 50V
2521	4822 124 41751	47µF 20% 50V
2521	4822 124 81151	22µF 50V
2522	4822 126 14585	100nF 10% 50V
2523▲	4822 126 13862	1.5nF 10% 2KV
2525	5322 122 34099	470pF 10% 63V
2526	4822 126 13482	470nF 20% 16V
2527	4822 122 33127	2.2nF 10% 63V
2528	5322 122 31647	1nF 10% 63V
2540	4822 122 33177	10nF 20% 50V
2560	4822 126 14152	680pF 10% 1KV
2561	2020 021 91496	100µF 20% 160V
2562	5322 122 32331	1nF 10% 100V
2563	5322 121 42386	100nF 5% 63V
2564	4822 124 12417	2200µF 20% 25V
2566	4822 124 81044	470µF 20% 6.3V
2567	4822 124 40433	47µF 20% 25V
2567	4822 124 81286	47µF 20% 16V
2580	4822 124 81286	47µF 20% 16V
2581	4822 124 81151	22µF 50V
2601	4822 126 14076	220nF 25V
2602	5322 122 32531	100pF 5% 50V
2606	5322 122 31647	1nF 10% 63V
2607	5322 122 32659	33pF 5% 50V
2608	4822 126 14043	1µF 20% 16V
2609	5322 122 32659	33pF 5% 50V
2611	4822 126 14043	1µF 20% 16V
2612	4822 126 13694	68pF 1% 63V
2613	4822 126 13694	68pF 1% 63V
2615	5322 122 31647	1nF 10% 63V
2616	4822 126 13482	470nF 20% 16V
2618	4822 126 14043	1µF 20% 16V
2619	4822 126 14043	1µF 20% 16V
2691	4822 124 40248	10µF 20% 63V
2801	4822 124 81151	22µF 50V
2802	4822 126 14076	220nF 25V
2803	4822 126 14491	2.2µF 10V
2804	4822 126 14491	2.2µF 10V
2805	4822 126 14491	2.2µF 10V
2831	5322 122 32447	1pF 5% 63V
2832	5322 122 32447	1pF 5% 63V
2833	4822 126 13692	47pF 1% 63V
2834	5322 122 32268	470P 5% 63V
2835	4822 122 33575	220pF 5% 63V
2836	4822 126 13344	1.5nF 5% 63V
2837	4822 124 40769	4.7µF 20% 100V
2840	4822 126 14585	100nF 10% 50V
2841	4822 124 40248	10µF 20% 63V
2842	4822 126 14585	100nF 10% 50V
2843	4822 124 40248	10µF 20% 63V
2844	4822 124 40248	10µF 20% 63V
2845	4822 126 14585	100nF 10% 50V
2846	4822 124 40207	100µF 20% 25V
2847	4822 126 14043	1µF 20% 16V
2849	5322 126 10511	1nF 5% 50V
2850	5322 126 10511	1nF 5% 50V
2851	2020 552 96305	4U7 20% 10V
2852	5322 126 10511	1nF 5% 50V
2853	2020 552 96305	4U7 20% 10V
2854	5322 126 10511	1nF 5% 50V
2855	4822 122 30045	27pF 2% 100V
2856	4822 126 13486	15pF 2% 63V
2857	5322 122 33538	150pF 2% 63V
2860	4822 126 13693	56pF 1% 63V
2894	4822 122 33575	220pF 5% 63V
2895	5322 116 80853	560pF 5% 63V
2897	4822 122 33172	390pF 5% 50V
2898	4822 122 33177	10nF 20% 50V
2902	4822 124 81144	1000µF 16V
2903	4822 124 21913	1µF 20% 63V
2904	4822 126 13482	470nF 20% 16V
2905	5322 122 31647	1nF 10% 63V
2906	4822 126 13482	470nF 20% 16V
2907	5322 122 31647	1nF 10% 63V
2908	4822 124 40248	10µF 20% 63V
2910	4822 122 33891	3.3nF 10% 63V
2911	4822 122 33891	3.3nF 10% 63V
2950	5322 122 31863	330pF 5% 63V

⊣▭

3000	4822 116 52175	100Ω 5% 0.5W
3001	4822 116 52175	100Ω 5% 0.5W
3002	4822 051 20008	jumper
3003	4822 117 11139	1k5 1% 0.1W
3004	4822 051 20822	8k2 5% 0.1W
3005	4822 116 52175	100Ω 5% 0.5W
3006	4822 117 11449	2k2 5% 0.1W
3007	4822 117 11507	6k8 1% 0.1W
3008	4822 117 11449	2k2 5% 0.1W
3101	4822 116 52199	68Ω 5% 0.5W
3102	4822 051 10102	1k 2% 0.25W
3103	4822 116 83868	150Ω 5% 0.5W
3104	3198 021 52240	220k 5%
3105	4822 116 83868	150Ω 5% 0.5W
3106	3198 021 52240	220k 5%
3123	4822 116 83868	150Ω 5% 0.5W
3124	4822 117 10834	47k 1% 0.1W
3125	4822 116 83868	150Ω 5% 0.5W

3126	4822 117 10834	47k 1% 0.1W
3136	4822 116 52175	100Ω 5% 0.5W
3151	4822 117 10361	680Ω 1% 0.1W
3152	4822 117 10361	680Ω 1% 0.1W
3153	4822 117 10361	680Ω 1% 0.1W
3200	4822 116 83881	390Ω 5% 0.5W
3201	4822 116 52175	100Ω 5% 0.5W
3202	4822 116 52175	100Ω 5% 0.5W
3203	4822 116 52175	100Ω 5% 0.5W
3204	4822 050 21003	10k 1% 0.6W
3206	4822 051 20333	33k 5% 0.1W
3207	4822 050 11002	1k 1% 0.4W
3208	4822 051 20391	390Ω 5% 0.1W
3209	4822 117 11373	100Ω 1%
3212	4822 051 20471	470Ω 5% 0.1W
3213	4822 116 52226	560Ω 5% 0.5W
3217	4822 051 20334	330k 5% 0.1W
3218	4822 117 11149	82k 1% 0.1W
3219	4822 117 11449	2k2 5% 0.1W
3220	4822 116 52175	100Ω 5% 0.5W
3221	4822 116 52226	560Ω 5% 0.5W
3222	4822 116 52175	100Ω 5% 0.5W
3223	4822 117 11373	100Ω 1%
3226	4822 051 20561	560Ω 5% 0.1W
3229	4822 117 11454	820Ω 1% 0.1W
3230	4822 117 11504	270Ω 1% 0.1W
3231	4822 051 20561	560Ω 5% 0.1W
3232	4822 051 20392	3k9 5% 0.1W
3235	4822 116 52175	100Ω 5% 0.5W
3241	4822 051 20223	22k 5% 0.1W
3242	4822 051 20273	27k 5% 0.1W
3242	4822 117 11383	12k 1% 0.1W
3244	4822 116 52231	820Ω 5% 0.5W
3245	4822 051 20393	39k 5% 0.1W
3246	4822 117 10833	10k 1% 0.1W
3247	4822 051 20274	270k 5% 0.1W
3247	4822 051 20684	680k 5% 0.1W
3248	4822 051 20333	33k 5% 0.1W
3249	4822 116 52231	820Ω 5% 0.5W
3250	4822 116 52283	4k7 5% 0.5W
3250	4822 116 52303	8k2 5% 0.5W
3251	4822 116 52175	100Ω 5% 0.5W
3256	4822 051 10102	1k 2% 0.25W
3257	4822 051 20106	10M 5% 0.1W
3258	4822 117 10837	100k 1% 0.1W
3259	4822 051 20474	470k 5% 0.1W
3331	4822 116 52175	100Ω 5% 0.5W
3332	3198 013 01020	1k 2% 1/2W
3333	4822 116 52175	100Ω 5% 0.5W
3334	3198 013 01020	1k 2% 1/2W
3335	4822 116 52175	100Ω 5% 0.5W
3336	3198 013 01020	1k 2% 1/2W
3340▲	4822 052 11109	10Ω 5% 0.5W
3341▲	4822 052 10108	1Ω 5% 0.33W
3342▲	4822 052 10108	1Ω 5% 0.33W
3343	3198 013 01520	1k5 2% 1/2W
3344	4822 116 52186	22Ω 5% 0.5W
3345	4822 117 13016	1M 50V MAX 115V
3346	4822 116 52186	22Ω 5% 0.5W
3347	4822 051 20008	jumper
3350	4822 051 20008	jumper
3353	4822 051 20008	jumper
3400	4822 116 52219	330Ω 5% 0.5W
3401	4822 050 23303	33k 1% 0.6W
3401	4822 116 52257	22k 5% 0.5W
3401	4822 116 83874	220k 5% 0.5W
3403	4822 116 52234	100k 5% 0.5W
3403	4822 116 52304	82k 5% 0.5W
3404	4822 050 11002	1k 1% 0.4W
3405	4822 050 24708	4Ω7 1% 0.6W
3405	4822 116 52176	10Ω 5% 0.5W
3406	4822 050 24708	4Ω7 1% 0.6W
3406	4822 116 52176	10Ω 5% 0.5W
3408	4822 116 52175	100Ω 5% 0.5W
3410	4822 050 21003	10k 1% 0.6W
3411▲	4822 052 10478	4Ω7 5% 0.33W
3441	4822 117 11373	100Ω 1%
3442	4822 117 11507	6k8 1% 0.1W
3443	4822 051 20105	1M 5% 0.1W
3445	4822 116 52244	15k 5% 0.5W
3446	4822 116 52289	5k6 5% 0.5W
3447	4822 050 15609	56Ω 1% 0.4W
3447	4822 116 52213	180Ω 5% 0.5W
3448	4822 116 52231	820Ω 5% 0.5W
3449	4822 116 52199	68Ω 5% 0.5W
3450	4822 116 52191	33Ω 5% 0.5W
3451▲	4822 052 10109	10Ω 5% 0.33W
3452▲	4822 050 24703	47k 1% 0.6W
3453▲	4822 050 11002	1k 1% 0.4W
3454▲	4822 050 21503	15k 1% 0.6W
3455	4822 053 11688	6Ω8 5% 2W
3456	4822 051 20008	jumper
3457	4822 051 20008	jumper
3458	4822 050 11002	1k 1% 0.4W
3459	4822 053 11153	15k 5% 2W
3460	4822 116 52276	3k9 5% 0.5W
3463	4822 116 52191	33Ω 5% 0.5W
3465	4822 050 22703	27k 1% 0.6W
3468	4822 116 52175	100Ω 5% 0.5W
3468	4822 116 52213	180Ω 5% 0.5W
3469	4822 116 52269	3k3 5% 0.5W
3470	4822 051 20274	270k 5% 0.1W
3470	4822 051 20474	470k 5% 0.1W
3471	4822 050 23308	3Ω3 1% 0.6W
3471	4822 050 23908	3Ω9 1% 0.6W
3471	4822 050 26808	6Ω8 1% 0.6W
3472	4822 050 23308	3Ω3 1% 0.6W
3472	4822 050 23908	3Ω9 1% 0.6W
3472	4822 050 26808	6Ω8 1% 0.6W
3473	4822 050 22208	2Ω2 1% 0.6W
3473	4822 050 23308	3Ω3 1% 0.6W
3473	4822 050 26808	6Ω8 1% 0.6W
3474	4822 050 22202	2k2 1% 0.6W
3475	4822 050 22202	2k2 1% 0.6W
3477	4822 116 83868	150Ω 5% 0.5W
3478	4822 116 83868	150Ω 5% 0.5W
3479	4822 117 12955	2k7 1% 0.1W
3480	4822 116 80676	1Ω5 5% 0.5W
3481▲	4822 050 21003	10k 1% 0.6W
3481▲	4822 050 21503	15k 1% 0.6W
3482▲	4822 050 21203	12k 1% 0.6W
3482▲	4822 050 21503	15k 1% 0.6W
3482▲	4822 050 28202	8k2 1% 0.6W
3484	4822 116 52276	3k9 5% 0.5W
3488▲	4822 052 11478	4Ω7 5% 0.5W
3490	4822 116 52303	8k2 5% 0.5W
3491	4822 050 21003	10k 1% 0.6W
3492	4822 050 11002	1k 1% 0.4W
3492	4822 116 83883	470Ω 5% 0.5W
3493▲	4822 052 10688	6Ω8 5% 0.33W
3494▲	4822 052 11478	4Ω7 5% 0.5W
3495	4822 051 20223	22k 5% 0.1W
3496	4822 117 10837	100k 1% 0.1W
3497	4822 117 10837	100k 1% 0.1W
3498	4822 117 11383	12k 1% 0.1W
3500▲	4822 053 21335	3M3 5% 0.5W
3501▲	4822 053 21335	3M3 5% 0.5W
3503	4822 116 21224	1M 387V
3504▲	4822 116 10105	9Ω 220V PTC
3506▲	4822 053 21155	1M5 5% 0.5W
3507	4822 252 11215	DSP301N-A21F
3508	4822 116 83872	220Ω 5% 0.5W
3510	4822 117 12765	4Ω7 20% 3W1
3519	4822 116 83876	270Ω 5% 0.5W
3520	4822 051 20122	1k2 5% 0.1W
3521	4822 116 52186	22Ω 5% 0.5W
3522	4822 051 20394	390k 5% 0.1W
3523	4822 052 10479	47Ω 5% 0.33W
3524	4822 117 11148	56k 1% 0.1W
3525	4822 051 10102	1k 2% 0.25W
3526	3198 012 11570	0Ω15 5% 1W
3527	4822 117 11744	0Ω22 5% 1W
3528	4822 051 20109	10Ω 5% 0.1W
3529	4822 117 10834	47k 1% 0.1W
3530	4822 117 10833	10k 1% 0.1W
3531	4822 051 20472	4k7 5% 0.1W
3532	4822 052 10222	2k2 5% 0.33W
3541	4822 051 20471	470Ω 5% 0.1W
3542	4822 117 11139	1k5 1% 0.1W
3543▲	2312 915 18203	82k 1%
3543▲	4822 050 28203	82k 1% 0.6W
3544▲	2120 108 92624	4k7 1% 6ΩN
3545	4822 051 20274	270k 5% 0.1W
3548	4822 116 83933	15k 1% 0.1W
3549	4822 116 83872	220Ω 5% 0.5W
3558	4822 053 10331	330Ω 5% 1W
3560	4822 116 52195	47Ω 5% 0.5W
3561	4822 116 83872	220Ω 5% 0.5W
3562	4822 117 11383	12k 1% 0.1W
3563	4822 051 20822	8k2 5% 0.1W
3564	2120 106 90565	0Ω1 5% 2W
3564	3198 012 21070	0Ω1+100%/-0% 2W
3567	4822 051 20182	1k8 5% 0.1W
3567	4822 117 11449	2k2 5% 0.1W
3568	4822 051 20822	8k2 5% 0.1W
3580	4822 117 10834	47k 1% 0.1W
3603	4822 116 52175	100Ω 5% 0.5W
3604	4822 116 52175	100Ω 5% 0.5W
3605	4822 051 20472	4k7 5% 0.1W
3606	4822 116 52256	2k2 5% 0.5W
3607	4822 116 52256	2k2 5% 0.5W
3608	4822 116 52175	100Ω 5% 0.5W
3609	4822 050 11002	1k 1% 0.4W
3610	4822 116 52303	8k2 5% 0.5W
3611	4822 117 11373	100Ω 1%
3612	4822 116 52303	8k2 5% 0.5W
3618	4822 050 21003	10k 1% 0.6W
3622	4822 117 11373	100Ω 1%
3623	4822 051 20472	4k7 5% 0.1W
3624	4822 116 52175	100Ω 5% 0.5W
3625	4822 116 52175	100Ω 5% 0.5W
3626	4822 051 20472	4k7 5% 0.1W
3627	4822 051 20472	4k7 5% 0.1W
3628	4822 117 10833	10k 1% 0.1W
3630	4822 117 11449	2k2 5% 0.1W
3632	4822 051 20008	jumper
3636	4822 117 11373	100Ω 1%
3637	4822 117 11927	75Ω 1% 0.1W
3638	4822 117 11927	75Ω 1% 0.1W
3681	4822 051 20391	390Ω 5% 0.1W
3682	4822 051 20332	3k3 5% 0.1W
3683	4822 051 20391	390Ω 5% 0.1W
3684	4822 051 20561	560Ω 5% 0.1W
3685	4822 051 20561	560Ω 5% 0.1W
3686	4822 117 11139	1k5 1% 0.1W
3691	4822 051 20008	jumper
3693	4822 117 11503	220Ω 1% 0.1W
3695	4822 117 13577	330Ω 1% 1.25W
3801	4822 116 83872	220Ω 5% 0.5W
3802	4822 050 11002	1k 1% 0.4W
3803	4822 117 10837	100k 1% 0.1W
3804	4822 117 11149	82k 1% 0.1W
3805	4822 051 10102	1k 2% 0.25W
3806	4822 117 10837	100k 1% 0.1W
3807	4822 117 11149	82k 1% 0.1W
3808	4822 050 11002	1k 1% 0.4W
3809	4822 117 11927	75Ω 1% 0.1W
3810	4822 117 11927	75Ω 1% 0.1W
3831	4822 117 10834	47k 1% 0.1W
3832	4822 116 52175	100Ω 5% 0.5W
3833	4822 116 52175	100Ω 5% 0.5W
3834	4822 116 52175	100Ω 5% 0.5W
3836	4822 050 11002	1k 1% 0.4W
3837	4822 116 52175	100Ω 5% 0.5W
3838	4822 051 10102	1k 2% 0.25W
3839	4822 116 52175	100Ω 5% 0.5W
3901	4822 051 10102	1k 2% 0.25W
3902	4822 051 20332	3k3 5% 0.1W
3903	4822 051 20332	3k3 5% 0.1W
3904	4822 117 10833	10k 1% 0.1W
3905	4822 051 20332	3k3 5% 0.1W
3906	4822 117 10833	10k 1% 0.1W
3907	4822 117 11507	6k8 1% 0.1W
4xxx	4822 051 10008	0Ω 5% 0.25W
4xxx	4822 051 20008	0Ω 5% 0.25W

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5001	4822 156 20966	47 µH
5002	3198 018 18270	820N 10%
5003	4822 157 11866	1.8µH 10%
5201	4822 157 11835	4.7µH 5%
5202	4822 157 51462	10µH 10%
5204	4822 157 11411	100mH
5205	4822 157 11411	100mH
5206	4822 157 11411	100mH
5241	4822 157 51462	10µH 10%
5242	4822 157 11706	10µH 5%
5342	4822 157 50961	22µH
5401	4822 157 11885	1000µH 5%
5445▲	2422 531 02471	TFM LOT JF0501-2135 B
5445▲	2422 531 02472	TFM LOT JF0501-2136 B
5450	2422 535 95427	IND FXD 100mH 120R
5452	4822 157 11411	100mH
5457▲	3128 138 56801	COI LINCOR DRUM
5457▲	4822 157 11712	LINEARITY COIL
5457▲	4822 157 11854	LINEARITY COIL
5461	2422 531 02446	DRIVER SC10009-03
5461	2422 531 02465	DRIVER SC10015-00
5463	2422 536 00048	COI BRIDGE C957-02
5463	4822 157 11711	CHOKE COIL
5471	2422 535 94638	IND FXD LHL08 6U8 20%
5471	3198 018 73380	FXDIND 8MM 3U3 20%
5472	4822 157 51157	3.3µH
5472	4822 158 10604	6.8 µH
5480	4822 156 20915	33µH
5480	4822 157 63788	18µH 10%
5480	5322 157 51687	
5500▲	4822 157 10476	DMF-2820H
5500▲	4822 157 11538	10mH 2A
5501▲	4822 157 11523	LINE 5mH /2A
5520▲	2422 531 02462	TFM SS42025-03
5521	4822 526 10704	100mH
5560	4822 526 10704	100mH
5561	4822 157 52392	27µH
5562	4822 526 10704	100mH
5564	4822 526 10704	100mH
5602	4822 157 11867	5.6µH 5%
5603	4822 157 11867	5.6µH 5%
5604	4822 157 11867	5.6µH 5%
5831	4822 157 11139	6.8µH 5%

5832	4822 157 11139	6.8µH 5%
5833	4822 157 11139	6.8µH 5%
5835	3198 018 31290	FXDIND 12U 10%

6001	4822 130 34142	BZX79-B33
6004	4822 130 10414	BA792
6201	4822 130 11397	BAS316
6202	4822 130 11397	BAS316
6206	4822 130 11416	PDZ6.8B
6331	4822 130 30842	BAV21
6332	4822 130 11397	BAS316
6333	4822 130 30842	BAV21
6335	4822 130 30842	BAV21
6400	4822 050 21002	1K 1% 0,6W
6401	4822 130 34145	BZX79-B39
6401	4822 130 34383	BZX79-B47
6444	4822 130 30621	1N4148
6445	3198 020 51090	DIO BZX384-C10
6445	4822 130 11551	UDZS10B
6447▲	4822 130 30621	1N4148
6448▲	4822 130 34167	BZX79-B6V2
6449	5322 130 34337	BAV99
6453	3198 020 55680	DIO BZX384-C5V6
6453	4822 130 11416	PDZ6.8B
6460	9340 559 50112	BY228/24
6461	4822 130 80572	RGP30J
6462	4822 130 61219	BZX79-B10
6465	4822 130 30842	BAV21
6466	4822 130 30842	BAV21
6467	5322 130 34331	BAV70
6468	4822 130 11397	BAS316
6470	5322 130 34337	BAV99
6476	4822 130 34281	BZX79-B15
6481	4822 130 34173	BZX79-B5V6
6482	4822 130 30862	BZX79-B9V1
6483	4822 130 34142	BZX79-B33
6485	4822 130 42606	BYD33J
6486	9322 164 42682	DIO EGP20DL-5100
6487	4822 130 42488	BYD33D
6488	9322 164 42682	DIO EGP20DL-5100
6500	4822 130 10741	GBU6J
6500	9322 132 55667	BRIDGE GBU4JL-7002
6520	4822 130 42488	BYD33D
6522	4822 130 11152	UDZ18B
6523	4822 130 30621	1N4148
6525	4822 130 31083	BYW55
6540	4822 130 34167	BZX79-B6V2
6541	3198 020 51090	DIO BZX384-C10
6541	4822 130 11551	UDZS10B
6560	3139 120 52021	DIO BYV29X-500
6561	4822 130 32715	SB340
6563	4822 130 11397	BAS316
6565	5322 130 34331	BAV70
6567	4822 130 11148	UDZ4.7B
6580	4822 130 11397	BAS316
6581	4822 130 11397	BAS316
6681	4822 130 31983	BAT85
6691▲	9322 172 20682	LED
6692	9322 174 42667	IR RECEIVER TOSP4136UH1
6831	4822 130 30621	1N4148
6901	4822 051 20008	JUMP

7001	4822 130 63732	MMUN2212
7101	4822 130 60511	BC847B
7200	9352 684 43557	TDA9555H/N1/3
7201	4822 130 60511	BC847B
7204	4822 130 60373	BC856B
7205	4822 130 60373	BC856B
7206	5322 130 42755	BC847C
7330	9352 576 50112	TDA6107Q/N2
7400	9322 157 37687	FET POW STP3NC60FP
7441	4822 130 60373	BC856B
7443▲	4822 130 44568	BC557B
7450	3198 010 44010	TRA PDTA114ET
7460	9340 550 92127	TRA BU4508DX
7461	4822 130 40981	BC337-25
7462	9340 547 00215	TRA PDTC143ZT
7463	4822 130 41246	BC327-25
7471	9352 635 76112	IC TDA8359J
7480	4822 130 40823	BD139
7480	4822 130 41109	BD135-16
7482	4822 130 40823	BD139
7482	4822 130 41109	BD135-16
7515▲	8238 274 02070	TCET1103G
7520	9352 673 56112	TEA1507P/N1
7521▲	3139 120 52031	FET STU9NC80ZI
7521▲	9322 160 63687	FET STP7NC80ZFP
7522	4822 130 60511	BC847B
7540	4822 130 40959	BC547B
7560	4822 209 15576	LE33CZ
7560	4822 209 16978	LF33CV
7561	9340 547 00215	TRA PDTC143ZT
7562	4822 130 60373	BC856B
7564	4822 130 60373	BC856B
7580	4822 130 60373	BC856B
7602	9322 147 25682	M24C16-WBN6
7606	9340 547 00215	TRA PDTC143ZT
7801	5322 209 11102	HEF4052BT
7802	5322 209 14481	HEF4053BT
7803	4822 130 60511	BC847B
7804	4822 130 60511	BC847B
7831	9322 160 79682	IC MSP3415G-PO-B8
7831	9322 160 82682	IC MSP3465G-PO-B8
7901	9322 158 65667	IC AN7522N
9611	4822 157 52392	27UH

CRT Panel [B1/B2]

Various

0019▲	4822 532 61201	
0028▲	4822 492 71627	DEG.COIL 29"ANZ140-2
0141	4822 492 70788	FIX IC
0142	3139 121 26231	SPRING
0166▲	3139 121 02140	LEAD
0244	4822 265 30735	5 PINS
0245	2422 025 04854	CON 6P Female
0254	2422 500 80053	CON CRT 9P F SEMI-DAF
0254▲	2422 500 80067	CON CRT V 9P F N-NECK
0278	4822 267 10735	B3B-EH-A
1991▲	4822 532 70308	
1992▲	2422 549 44575	DEFL YOKE KDY3NWC32P

2330	4822 121 51473	470nF 20% 63V
2340	4822 124 11565	10µF 20% 250V
2341▲	4822 126 13599	3.3nF 10% 500V
2342▲	5322 122 31647	1nF 10% 63V
2343▲	4822 126 12278	3300pF 10% 2KV
2344	4822 126 14585	100nF 10% 50V
2345▲	4822 122 31175	1nF 10% 500V
2346▲	4822 126 13435	1.2nF 10% 2KV
2360	4822 124 40764	22µF 100V
2361	4822 124 40207	100µF 20% 25V
2365	4822 121 40516	22nF 10% 250V
2366	4822 121 40334	100nF 10% 100V
2367	4822 126 13692	47pF 1% 63V
2368	5322 122 32654	22nF 10% 63V
2372	5322 122 32967	5.6pF 10% 63V

3331	4822 116 52175	100Ω 5% 0.5W
3332	3198 013 01020	1k 2% 1/2W
3333	4822 116 52175	100Ω 5% 0.5W
3334	3198 013 01020	1k 2% 1/2W
3335	4822 116 52175	100Ω 5% 0.5W
3336	3198 013 01020	1k 2% 1/2W
3340▲	4822 052 11109	10Ω 5% 0.5W
3341▲	4822 052 10108	1Ω 5% 0.33W
3342▲	4822 052 10108	1Ω 5% 0.33W
3343	3198 013 01520	1k5 2% 1/2W
3344	4822 116 52186	22Ω 5% 0.5W
3345	4822 117 13016	1M 50V MAX 115V
3346	4822 116 52186	22Ω 5% 0.5W
3347	4822 051 20008	jumper
3350	4822 051 20008	jumper
3353	4822 051 20008	jumper
3360	4822 117 13424	8k2 5% 5W
3362▲	4822 052 10109	10Ω 5% 0.33W
3363	4822 116 52231	820Ω 5% 0.5W
3364	4822 116 81039	1Ω8 5% 0.5W
3368	4822 117 12955	2k7 1% 0.1W
3369	4822 117 10833	10k 1% 0.1W
3370	4822 117 13577	330Ω 1% 1.25W
3371	4822 051 20472	4k7 5% 0.1W
3374	4822 116 52291	56k 5% 0.5W
3375	4822 116 83883	470Ω 5% 0.5W
3376	4822 051 20008	jumper
3378	4822 117 11148	56k 1% 0.1W
3379	4822 051 20472	4k7 5% 0.1W
3382	4822 117 11139	1k5 1% 0.1W
3383	4822 051 20471	470Ω 5% 0.1W
3384	4822 117 11454	820Ω 1% 0.1W
3385	4822 116 81039	1Ω8 5% 0.5W
3386	4822 051 20472	4k7 5% 0.1W
3387	4822 051 20471	470Ω 5% 0.1W
3388	4822 116 83872	220Ω 5% 0.5W
3389	4822 116 83872	220Ω 5% 0.5W
3390	4822 051 20109	10Ω 5% 0.1W
3391	4822 051 20109	10Ω 5% 0.1W

5203▲	4822 157 11444	DEGAUSSING COIL
5342	4822 156 21125	3.9µH 10%
5360	4822 157 51216	5.6µH

6331	4822 130 30842	BAV21
6332	4822 130 11397	BAS316
6333	4822 130 30842	BAV21
6335	4822 130 30842	BAV21

7330	9352 576 50112	IC TDA6107Q/N2
7360	4822 130 42589	BF370
7362	9322 166 55682	TRA POW 2SA1358
7363	4822 130 44154	BF199
7365	9322 166 56682	TRA POW 2SC3421
7367	4822 130 44568	BC557B

Side AV [E/E1]

Various

0163	3139 131 01551	CBLE 6P
0186	3139 110 38861	CBLE 5P
0232▲	4822 267 31014	HEADPHONE SOCKET
0246	4822 267 10734	B5B-EH-A
0250	4822 265 11606	3P
0251	4822 267 10735	B3B-EH-A
0253	2422 025 16382	CON 3P Male
0254	4822 267 10734	B5B-EH-A
0255	4822 267 10565	4P

2171	5322 122 32311	470pF 10% 100V
2172	5322 122 32311	470pF 10% 100V
2173	5322 122 32311	470pF 10% 100V
2174	5322 122 32311	470pF 10% 100V
2176	5322 122 32311	470pF 10% 100V
2177	4822 124 40248	10µF 20% 63V
2178	5322 122 32311	470pF 10% 100V
2179	4822 124 40248	10µF 20% 63V

3150	4822 116 83884	47k 5% 0.5W
3151	4822 116 83868	150Ω 5% 0.5W
3152	4822 116 83884	47k 5% 0.5W
3153	4822 116 83868	150Ω 5% 0.5W
3155	4822 116 52201	75Ω 5% 0.5W
3156	4822 116 52206	120Ω 5% 0.5W
3157	4822 116 52206	120Ω 5% 0.5W

6161	4822 130 34278	BZX79-B6V8

External Power Supply [F]

Various

xxxx	3139 137 23881	Ext. power supply module

UIR/LS Panel [H]

Various

C1	4822 124 40207	100UF 20% 25V
C2	4822 126 14305	100NF 10% 16V
C3	4822 126 14305	100NF 10% 16V
C5	4822 126 14305	100NF 10% 16V
C6	4822 126 14238	2N2 50V
D1	4822 130 34173	BZX79-B5V6
D2	4822 130 30621	1N4148
D3	4822 130 10852	BZX284-C6V8
D4	4822 130 10852	BZX284-C6V8
D5	4822 130 10852	BZX284-C6V8

D9	4822 130 10852	BZX284-C6V8
Q1	4822 130 60511	BC847B
Q2	4822 130 60373	BC856B
Q4	9310 125 00235	N-CHANNEL MOS BSN20
Q5	4822 130 60373	BC856B
Q6	4822 130 60511	BC847B
Q7	4822 130 60511	BC847B
Q8	4822 130 60511	BC847B
R1	4822 116 83876	270R 5% 0,5W
R2	4822 051 30103	10K 5% 0,062W
R3	4822 051 30103	10K 5% 0,062W
R4	4822 051 30103	10K 5% 0,062W
R5	4822 051 30272	2K7 5% 0,062W
R6	4822 051 30101	100R 5% 0,062W
R7	4822 051 30101	100R 5% 0,062W
R8	4822 051 30102	1K 5% 0,062W
R9	4822 051 30471	470R 5% 0,062W
U1	9965 000 11345	JACK HOR
U2	2422 026 05223	CON PHONE 1P F 3.5 ST
U3	5322 209 14481	HEF4053BT
D10	4822 130 81637	PMLL4148L
D11	4822 130 34441	BZX79-B22
D12	4822 130 34441	BZX79-B22
R10	4822 051 30103	10K 5% 0,062W
R11	4822 051 30103	10K 5% 0,062W
R12	4822 051 30103	10K 5% 0,062W
R13	4822 051 30103	10K 5% 0,062W
R15	4822 051 30102	1K 5% 0,062W
R17	4822 051 30103	10K 5% 0,062W
R18	4822 117 13632	100K 1% 0.62W
R19	4822 051 30101	100R 5% 0,062W
R20	4822 051 30479	47R 5% 0,062W
R21	4822 051 30102	1K 5% 0,062W
R22	4822 051 30103	10K 5% 0,062W
R23	4822 117 13632	100K 1% 0.62W
R24	4822 117 13632	100K 1% 0.62W
R25	4822 051 30008	JUMPER
R26	4822 051 30103	10K 5% 0,062W
R33	4822 051 30008	JUMPER
RT1	2122 622 00027	PTC 60V 0R88
0240	2422 025 11244	CON 7P Male
0251	4822 267 10565	CON 4P
0259	2422 025 16387	CON 5P Male
0262	2422 025 16936	CON 3P Male
0262	2422 025 16937	CON 3P Female
0267	4822 267 10735	B3B-EH-A
1246	2422 025 16382	CON 3P Male
1251	2422 020 00725	CON 3P Male
1259	4822 265 41391	B9B-EH-A
1660	2422 543 01203	XTL 12MHz

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2601	4822 126 14076	220nF 25V
2602	5322 122 32531	100pF 5% 50V
2606	5322 126 10511	1nF 5% 50V
2607	5322 122 32659	33pF 5% 50V
2608	4822 126 14043	1µF 20% 16V
2609	5322 122 32659	33pF 5% 50V
2611	4822 126 14043	1µF 20% 16V
2612	4822 126 13694	68pF 1% 63V
2613	4822 126 13694	68pF 1% 63V
2615	5322 126 10511	1nF 5% 50V
2616	4822 126 14076	220nF 25V
2618	4822 126 14043	1µF 20% 16V
2619	4822 126 14043	1µF 20% 16V

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3603	4822 116 52175	100Ω 5% 0.5W
3604	4822 116 52175	100Ω 5% 0.5W
3605	4822 051 20472	4k7 5% 0.1W
3606	4822 116 52256	2k2 5% 0.5W
3607	4822 116 52256	2k2 5% 0.5W
3608	4822 116 52175	100Ω 5% 0.5W
3611	4822 117 11373	100Ω 1%
3622	4822 117 11373	100Ω 1%
3624	4822 116 52175	100Ω 5% 0.5W
3625	4822 116 52175	100Ω 5% 0.5W
3626	4822 051 20472	4k7 5% 0.1W
3627	4822 051 20472	4k7 5% 0.1W
3628	4822 117 10833	10k 1% 0.1W
3630	4822 117 11449	2k2 5% 0.1W
3632	4822 051 20008	jumper
3636	4822 117 11373	100Ω 1%
3695	4822 117 13577	330Ω 1% 1.25W
4xxx	4822 051 10008	0Ω 5% 0.25W
4xxx	4822 051 20008	0Ω 5% 0.25W

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5602	4822 157 11867	5.6µH 5%
5603	4822 157 11867	5.6µH 5%
5604	4822 157 11867	5.6µH 5%

Interface Panel [J]

Various

0217	2422 025 12482	CON 6P Male
0217	2422 025 16385	CON 4P Male
0227	2422 025 15849	CON 6P Male
0228	2422 025 16386	CON 5P Male
0229	4822 267 10735	B3B-EH-A
0237	4822 267 10565	4P
0240	2422 025 11244	CON 7P Male
0242	2422 025 17042	CON 7P Male
0242	4822 267 10557	B10B-EH-A
0251	4822 267 10565	4P
0259	2422 025 15848	CON 5P Male
0259	2422 025 16387	CON 5P Male
0262	2422 025 16937	CON 3P Female
0285	4822 267 10676	1P
1259	4822 265 41391	B9B-EH-A
1800	3135 010 03531	32PIN CONN

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2700	3198 017 41050	1µF 10V
2701	4822 126 14305	100nF 10% 16V
2702	3198 017 41050	1µF 10V
2703	4822 124 41584	100µF 20% 10V
2704	3198 017 41050	1µF 10V
2705	4822 122 33761	22pF 5% 50V
2709	4822 126 14305	100nF 10% 16V
2710	4822 126 14305	100nF 10% 16V
2711	4822 122 31765	100pF 2% 63V
2712	4822 122 31765	100pF 2% 63V
2713	4822 126 14305	100nF 10% 16V
2714	4822 126 14238	2N2 50V

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3700	4822 051 30562	5k6 5% 0.063W
3701	4822 051 30223	22k 5% 0.062W
3702	4822 051 30223	22k 5% 0.062W
3703	4822 051 30759	75Ω 5% 0.062W
3704	4822 051 30472	4k7 5% 0.062W
3706	4822 051 30683	68k 5% 0.062W
3707	4822 051 30103	10k 5% 0.062W
3708	4822 117 12925	47k 1% 0.063W 0603
3710	4822 117 12925	47k 1% 0.063W 0603
3715	4822 051 30101	100Ω 5% 0.062W
3716	4822 051 30103	10k 5% 0.062W
3717	4822 051 30103	10k 5% 0.062W
3718	4822 051 30103	10k 5% 0.062W
3719	4822 051 30562	5k6 5% 0.063W 0603 RC21 RST SM
3720	4822 051 30103	10k 5% 0.062W
3721	4822 051 30472	4k7 5% 0.062W
3722	4822 051 30472	4k7 5% 0.062W
3729	4822 051 30103	10k 5% 0.062W
3731	4822 117 12968	820Ω 5% 0.62W
3733	4822 117 12925	47k 1% 0.063W
3734	4822 117 12925	47k 1% 0.063W
3736	4822 051 30759	75Ω 5% 0.062W
3737	4822 051 30124	120k 5% 0.062W
3738	4822 051 30682	6k8 5% 0.062W
3739	4822 053 11688	6Ω8 5% 2W
3740	4822 116 83872	220Ω 5% 0.5W
3741	4822 051 30102	1k 5% 0.062W
3743	4822 051 30101	100Ω 5% 0.062W
3744	4822 051 30101	100Ω 5% 0.062W
3745	4822 050 21003	10k 1% 0.6W
3746	4822 051 30103	10k 5% 0.062W
3748	4822 051 30103	10k 5% 0.062W
3749	4822 051 30103	10k 5% 0.062W
4xxx	4822 051 10008	0Ω 5% 0.25W
4xxx	4822 051 20008	0Ω 5% 0.25W

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5705	4822 157 11149	56µH 5%

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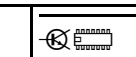
6701	4822 130 42488	BYD33D
6702	4822 130 83757	MCL4148
6703	4822 130 34233	BZX79-B5V1
6704	4822 130 11666	BZX284-C8V2
6706	4822 130 11666	BZX284-C8V2



7700	4822 130 60511	BC847B
7701	4822 130 60511	BC847B
7705	4822 130 60373	BC856B
7706	4822 130 60511	BC847B
7708	4822 130 60511	BC847B
7710	9322 119 29685	DS1813R-5
7711	4822 130 60511	BC847B
7712	4822 130 60511	BC847B
7715	4822 130 60511	BC847B
7716	4822 130 60511	BC847B
7717	5322 209 73179	74HCT74D
7718	4822 130 60511	BC847B

Front Interface [Q/Q1]

Various

0187▲	3139 124 33461	FR INTF BKT 29SDRF
0196▲	3139 131 01251	CBL 5P/400/5P
0211▲	2422 025 16268	CON 2P Male
0212▲	2422 025 16268	CON 2P Male
0214	2422 025 06353	CON 5P Male
0214	4822 267 10734	B5B-EH-A
0231▲	2422 128 02972	SWI POW 2P
0232▲	4822 267 31014	HEADPHONE SOCKET
0254	2422 025 06353	CON 5P Male
0255	4822 267 10567	4P
1600	4822 276 13775	SWITCH
1601	4822 276 13775	SWITCH
1602	4822 276 13775	SWITCH
1603	4822 276 13775	SWITCH

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2176	5322 122 32311	470pF 10% 100V
2177	4822 124 40207	100µF 20% 25V
2178	5322 122 32311	470pF 10% 100V
2179	4822 124 40207	100µF 20% 25V
2691	4822 124 40248	10µF 20% 63V
2698	5322 121 42386	100nF 5% 63V

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3156	4822 116 52206	120Ω 5% 0.5W
3157	4822 116 52206	120Ω 5% 0.5W
3500▲	4822 053 21335	3M3 5% 0.5W
3501▲	4822 053 21335	3M3 5% 0.5W
3681	4822 116 83881	390Ω 5% 0.5W
3682	4822 116 52269	3k3 5% 0.5W
3683	4822 116 83881	390Ω 5% 0.5W
3684	4822 116 52226	560Ω 5% 0.5W
3685	4822 116 52226	560Ω 5% 0.5W
3686	4822 116 52243	1k5 5% 0.5W
3693	4822 116 83872	220Ω 5% 0.5W

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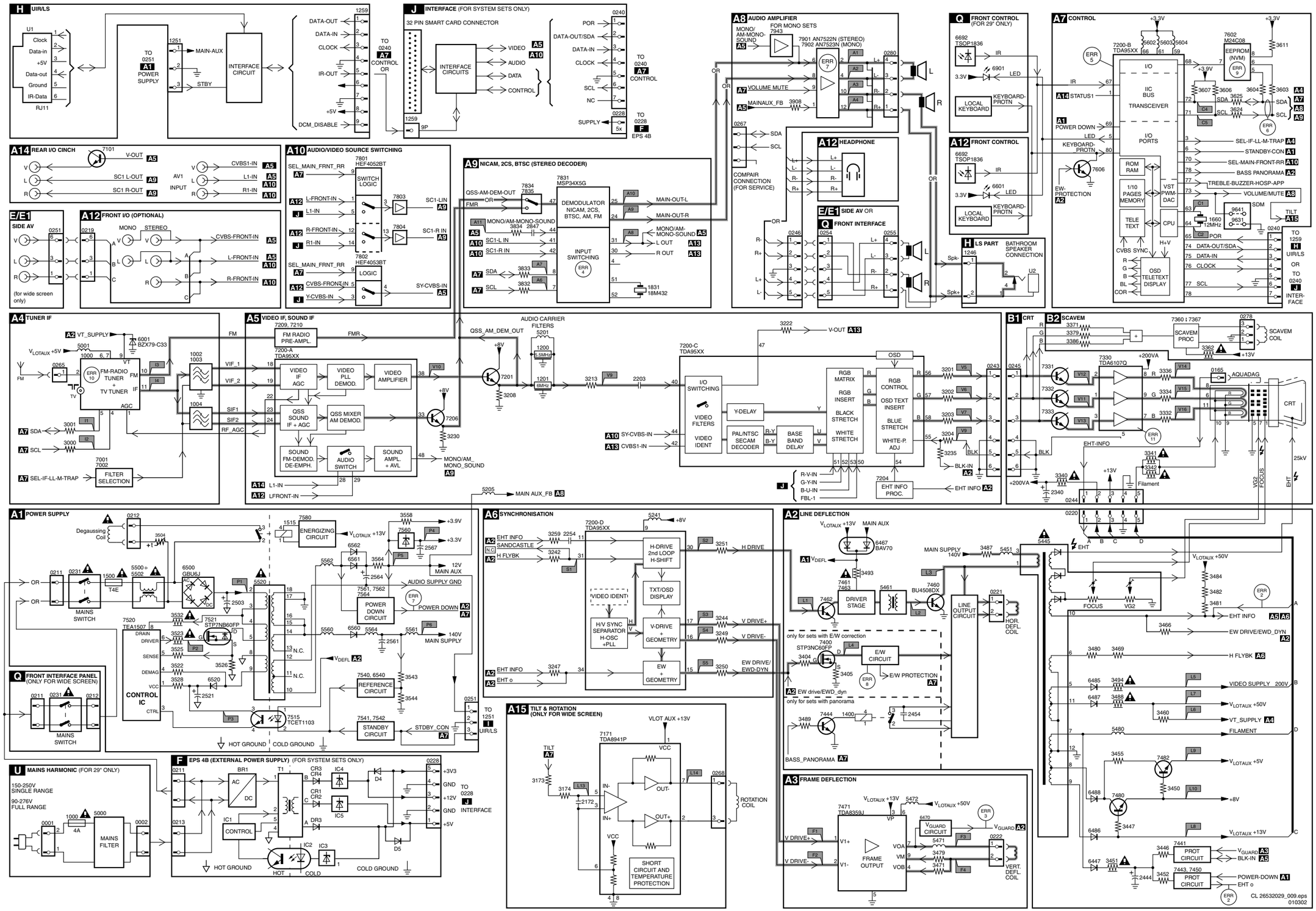
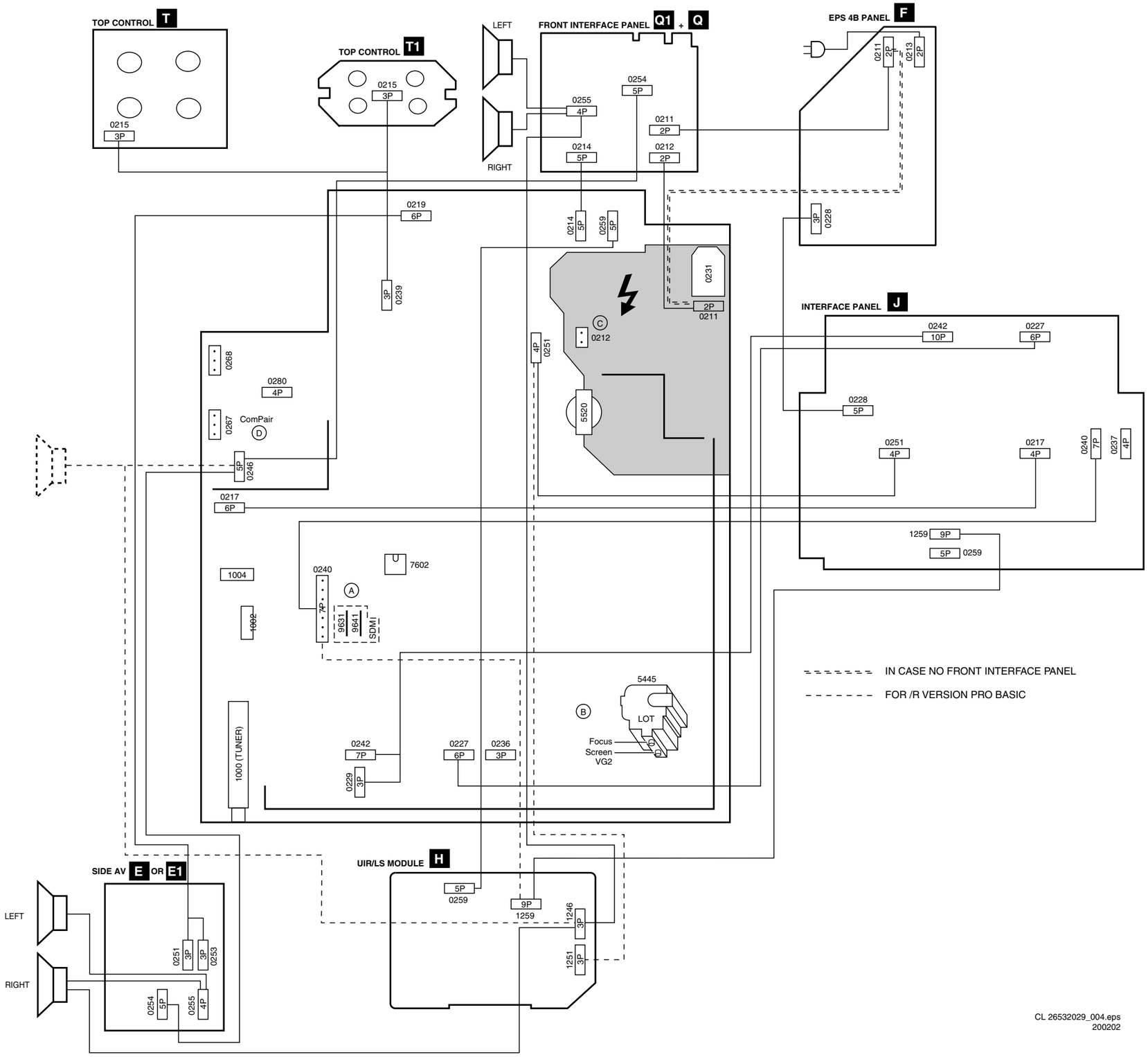
6681	4822 130 31983	BAT85
6691▲	9322 172 20682	LED
6692	9322 174 42667	IR RECEIVER

6. Block Diagram, Testpoints, I²C, and Supply Voltage Overview

Block Diagram


H UIR/LS
J INTERFACE (FOR SYSTEM SETS ONLY)
32 PIN SMART CARD CONNECTOR
A8 AUDIO AMPLIFIER
Q FRONT CONTROL (FOR 29" ONLY)
A7 CONTROL
A14 REAR I/O CINCH
A10 AUDIO/VIDEO SOURCE SWITCHING
A9 NICAM, 2CS, BTSC (STEREO DECODER)
A12 HEADPHONE
E/E1 SIDE AV
A12 FRONT I/O (OPTIONAL)
Q FRONT INTERFACE
H LS PART BATHROOM SPEAKER CONNECTION
A12 FRONT CONTROL
A4 TUNER IF
A5 VIDEO IF, SOUND IF
B1 CRT
B2 SCAVEM
A1 POWER SUPPLY
A6 SYNCHRONISATION
A2 LINE DEFLECTION
A3 FRAME DEFLECTION
A15 TILT & ROTATION (ONLY FOR WIDE SCREEN)
Q FRONT INTERFACE PANEL (ONLY FOR WIDE SCREEN)
U MAINS HARMONIC (FOR 29" ONLY)
F EPS 4B (EXTERNAL POWER SUPPLY) (FOR SYSTEM SETS ONLY)
CL 26532029_009.eps 010302

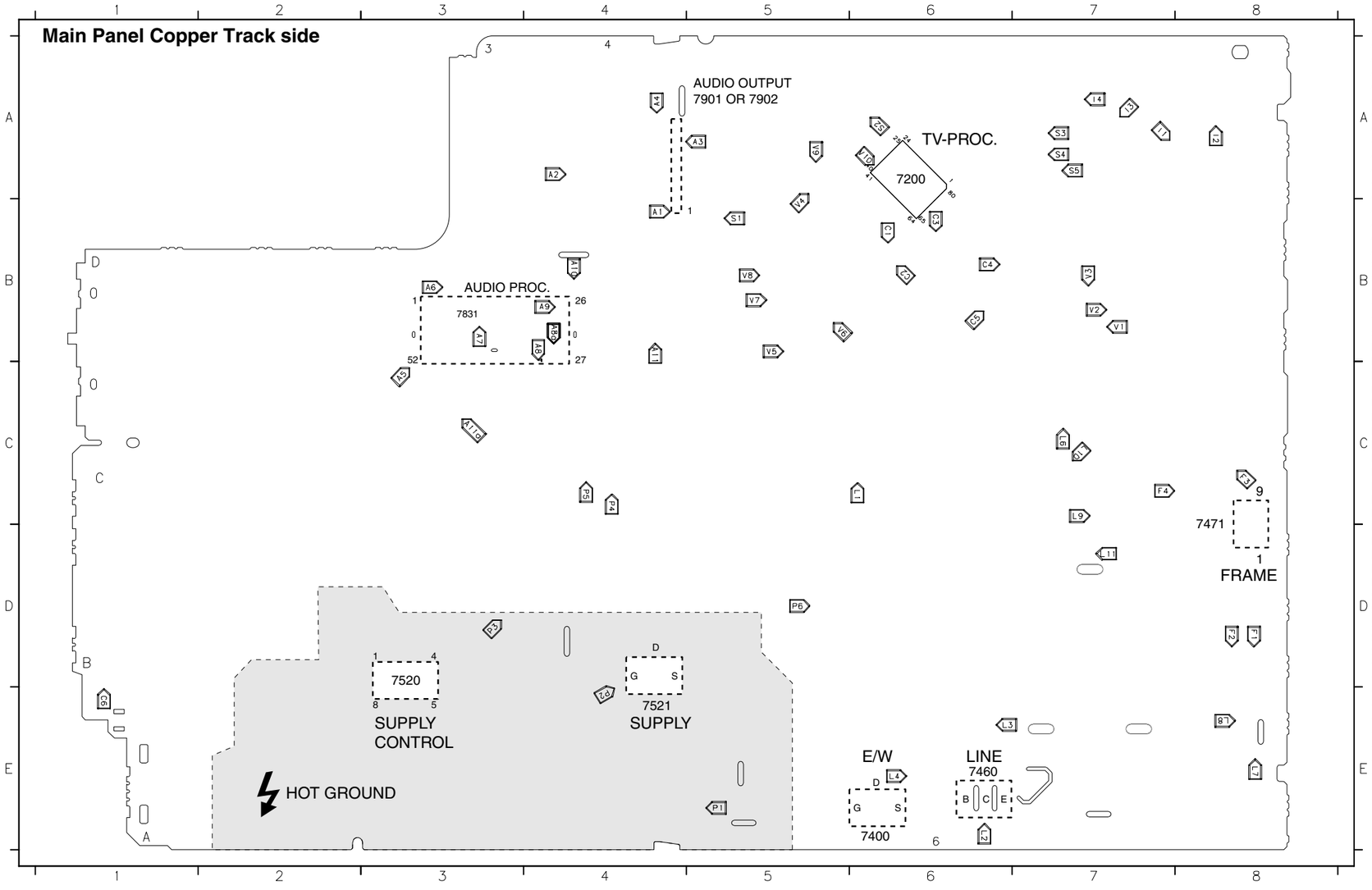
Wiring Diagram



CL 26532029_004.eps
200202

Testpoint Overview

Main Panel Copper Track side



A1	B4
A2	A4
A3	A5
A4	A4
A5	C3
A6	B3
A7	B3
A8	B4
A8a	B4
A9	B4
A10	B4
A11	B4
A11a	C3
A12	C2
A13	C2
A14	C1
A15	B2
A16	B2
C1	B6
C2	B6
C3	B6
C4	B6
C5	B6
C6	E1
F1	D8
F2	D8
F3	C8
L1	C6
L2	E6
L3	E7
L4	E6
L6	C7
L7	E8
L8	E8
L9	C7
L11	D7
P1	E5
P2	E4
P3	D3
P4	C4
P5	C4
P6	D5
S1	B5
S2	A6
S3	A7
S4	A7
S5	A7
V1	B7
V2	B7
V3	B7
V4	B5
V5	B5
V6	B5
V7	B5
V8	B5
V9	A5

L1
1V / div DC
20us / div

S3
500mV / div DC
5ms / div

V12
1V / div DC
10us / div

L2
1V / div DC
20us / div

S4
500mV / div DC
5ms / div

V13
1V / div DC
10us / div

L4
5V / div DC
5ms / div

S5
1V / div DC
5ms / div

V14
50V / div DC
10us / div

L5 = +200V
L6 = +50V
L7 = +50V
L8 = +13V
L9 = +5V
L10 = +8V
L11 = +13V

V5
1V / div DC
10us / div

V15
50V / div DC
10us / div

L12
2V / div DC
20us / div

V6
1V / div DC
10us / div

V16
50V / div DC
10us / div

P1 = "$"

V7
1V / div DC
10us / div

P2
2V / div DC
5us / div

V8
2V / div DC
5ms / div

P3 = 16V8 (13V8)

P4 = 3V3

P5 = 12V

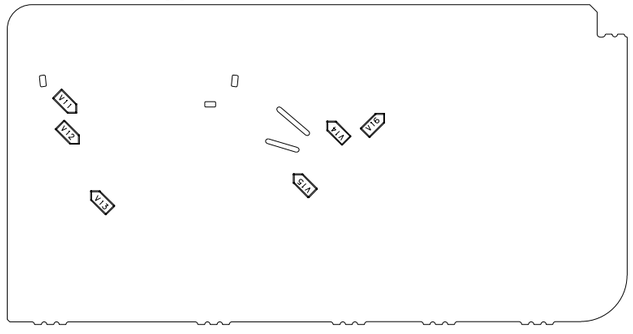
P6 = 140V

V9
500mV / div DC
10us / div

V10
200mV / div DC
20us / div

V11
1V / div DC
10us / div

CRT Panel Copper Track Side



A1
1V / div DC
500us / div

A4
1V / div DC
500us / div

A8
1V / div DC
500us / div

A10
500mV / div DC
500us / div

C1
1V / div DC
500us / div

C5
2V / div DC
200us / div

F3
10V / div DC
5ms / div

I2
2V / div DC
200us / div

A2
1V / div DC
500us / div

A6
2V / div DC
200us / div

A8a
1V / div DC
500us / div

A11
1V / div DC
200us / div

C2
1V / div DC
500us / div

F1
500mV / div DC
5ms / div

F4
5V / div DC
5ms / div

I3
500mV / div DC
10us / div

S1
2V / div DC
20us / div

A3
1V / div DC
500us / div

A7
2V / div DC
200us / div

A9
500mV / div DC
500us / div

A11a
500mV / div DC
2us / div

C4
2V / div DC
200us / div

F2
500mV / div DC
5ms / div

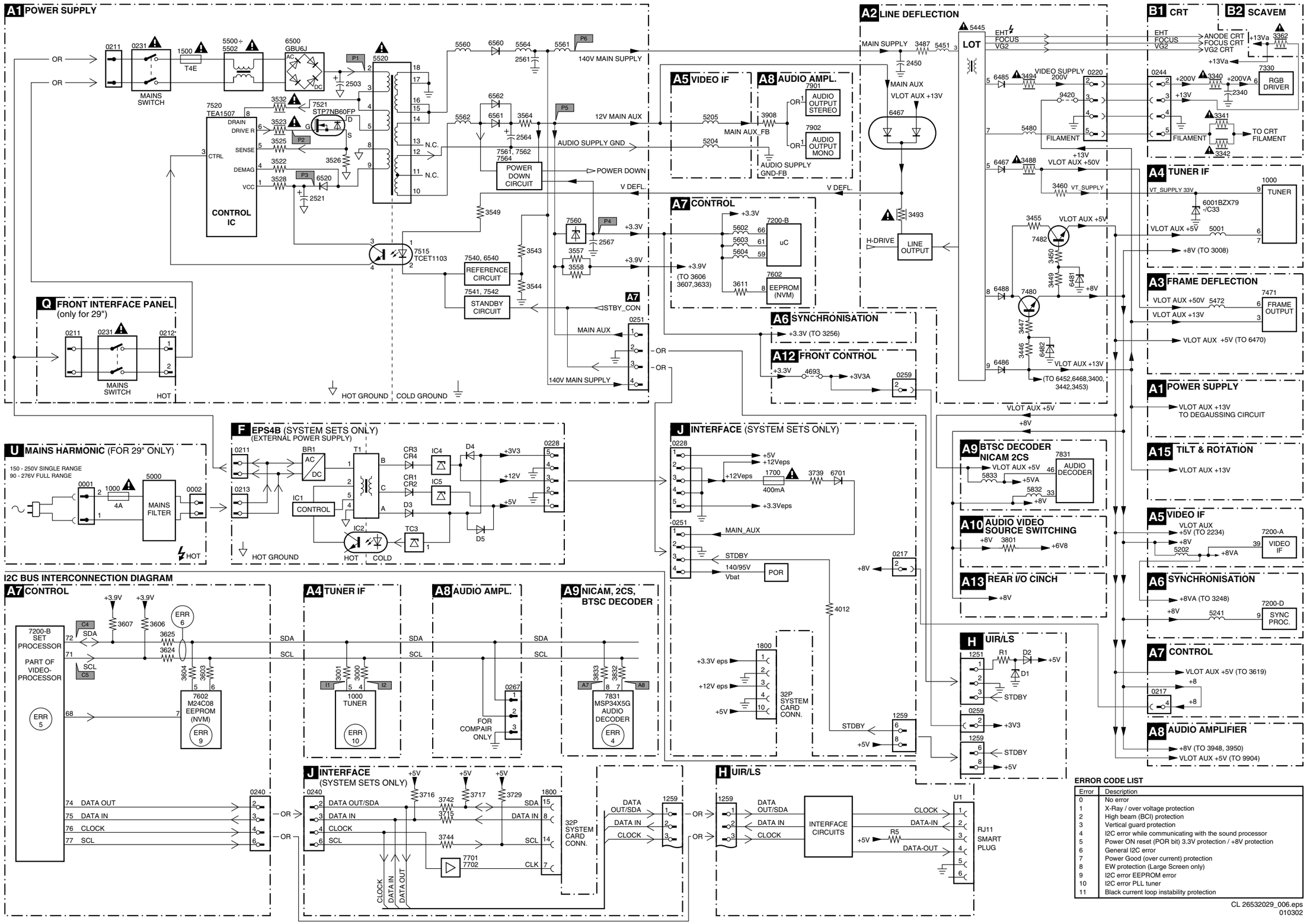
I1
2V / div DC
200us / div

I4
20mV / div DC
10us / div

S2
500mV / div DC
20us / div

C1

I2C And Supply Voltage Diagram



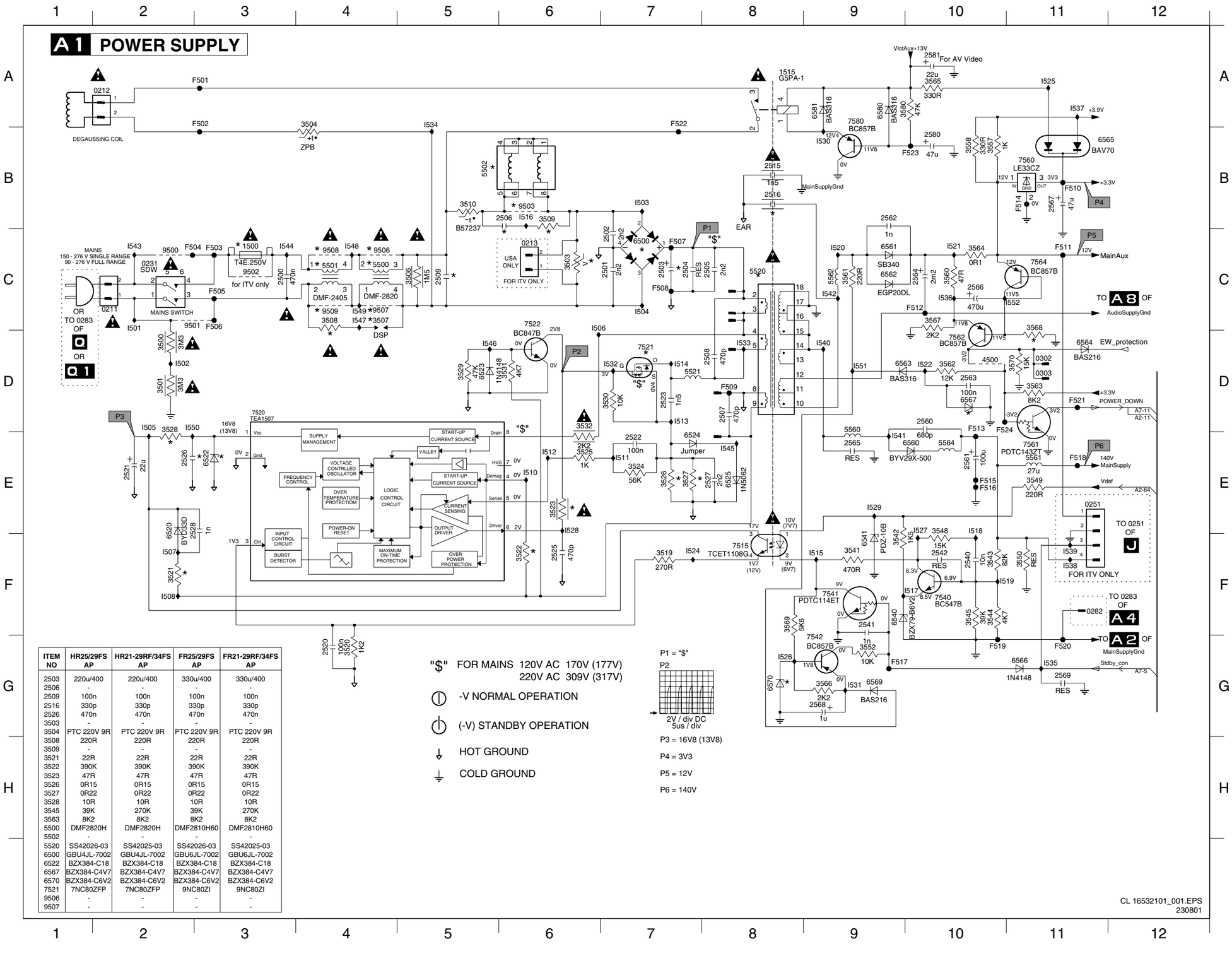
ERROR CODE LIST

Error	Description
0	No error
1	X-Ray / over voltage protection
2	High beam (BCI) protection
3	Vertical guard protection
4	I2C error while communicating with the sound processor
5	Power ON reset (POR bit) 3.3V protection / +8V protection
6	General I2C error
7	Power Good (over current) protection
8	EW protection (Large Screen only)
9	I2C error EEPROM error
10	I2C error PLL tuner
11	Black current loop instability protection

CL 26532029_006.eps
010302

7. Schematics and PWB's

Large Signal Panel: Power supply

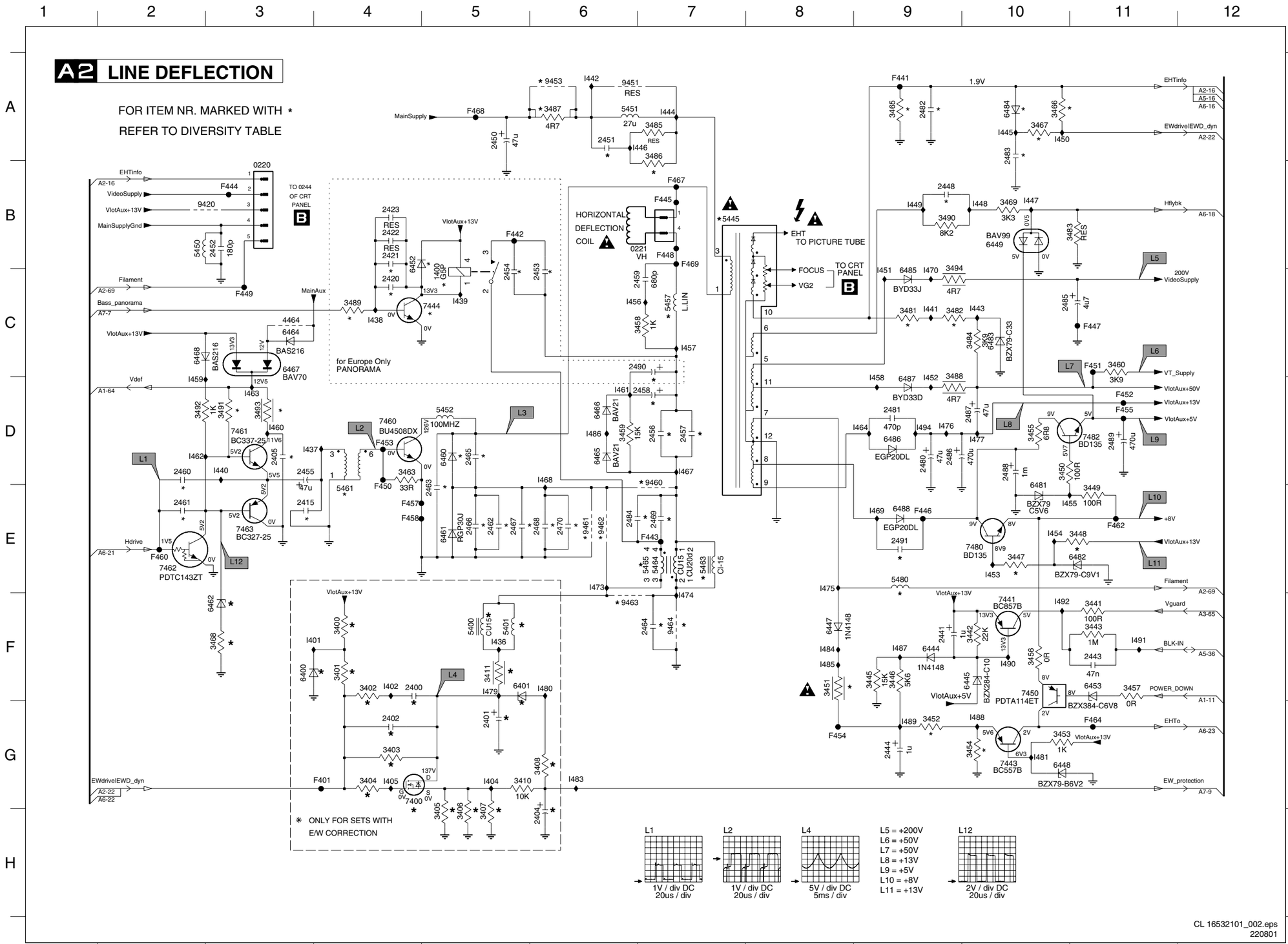


ITEM NO	HR25/29FS AP	HR21-29RF/34FS AP	FR25/29FS AP	FR21-29RF/34FS AP
2503	220u/400	220u/400	330u/400	330u/400
2506	-	-	-	-
2509	100n	100n	100n	100n
2516	330p	330p	330p	330p
2526	470n	470n	470n	470n
3503	-	-	-	-
3504	PTC 220V 9R	PTC 220V 9R	PTC 220V 9R	PTC 220V 9R
3508	220R	220R	220R	220R
3509	-	-	-	-
3521	22R	22R	22R	22R
3522	390K	390K	390K	390K
3523	47R	47R	47R	47R
3526	0R15	0R15	0R15	0R15
3527	0R22	0R22	0R22	0R22
3528	10R	10R	10R	10R
3545	39K	270K	39K	270K
3563	8K2	8K2	8K2	8K2
5500	DMF2820H	DMF2820H	DMF2810H60	DMF2810H60
5502	-	-	-	-
5520	SS42026-03	SS42025-03	SS42026-03	SS42025-03
6500	GBU4JL-7002	GBU4JL-7002	GBU6JL-7002	GBU6JL-7002
6522	BZX384-C18	BZX384-C18	BZX384-C18	BZX384-C18
6567	BZX384-C4V7	BZX384-C4V7	BZX384-C4V7	BZX384-C4V7
6570	BZX384-C6V2	BZX384-C6V2	BZX384-C6V2	BZX384-C6V2
7521	7NC80ZFP	7NC80ZFP	9NC80ZI	9NC80ZI
9506	-	-	-	-
9507	-	-	-	-

CL 16532101_001.EPS
230801

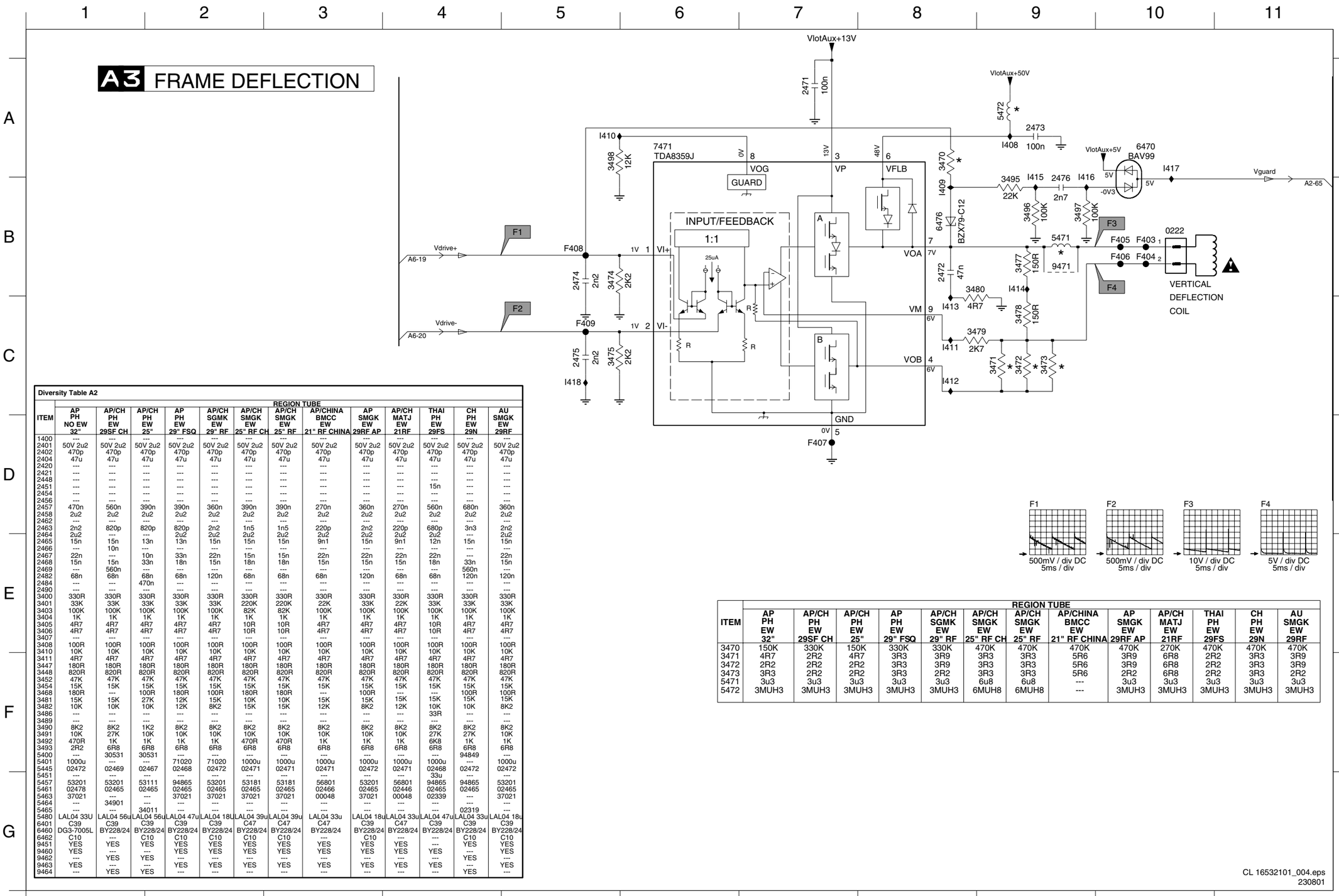
0211 C2
0212 A2
0213 C6
0231 C2
0251 E11
0282 F11
0302 D11
0303 D11
1500 C3
1515 A8
2500 C3
2501 C7
2502 C7
2503 C7
2504 C7
2505 C8
2506 B6
2507 D8
2508 D8
2509 C5
2515 B8
2516 B8
2520 G4
2521 E2
2522 E7
2523 D7
2525 F6
2526 E2
2527 E8
2528 E3
2540 F10
2541 F9
2560 D10
2561 E10
2562 B9
2563 D10
2564 C10
2565 E9
2566 C10
2567 B11
2568 G9
2569 G11
2580 B10
2581 A10
3500 D2
3501 D2
3503 C6
3504 A4
3506 C5
3507 C4
3508 C4
3509 B6
3510 B5
3519 F7
3520 G4
3521 F2
3522 E6
3523 E6
3524 E7
3525 E6
3526 E7
3527 E7
3528 D2
3529 D5
3530 D7
3531 D6
3532 D6
3541 F9
3542 F9
3543 F10
3544 F10
3545 F10
3548 E10
3549 E11
3550 F11
3552 G9
3557 B10
3558 B10
3560 C10
3561 C9
3562 D10
3563 D11
3564 C10
3565 A10
3566 G9
3567 C10
3568 C11
3569 F8
3570 D11
3580 A10
4500 D10
5500 C4
5501 C4
5502 B5
5520 C8
5521 D7
5560 D9
5561 E11
5562 C9
5564 E10
6500 C7
6520 E2
6522 E3
6523 D5
6524 E7
6525 E8
6540 F9
6541 F9
6560 E10
6561 C9
6562 C9
6563 D9
6564 D11
6565 B12
6566 C11
6567 D10
6569 G9
6570 G8
6580 A9
6581 A9
7515 F8
7520 D3
7521 D7
7522 C6
7540 F10
7541 F9
7542 G9
7560 B11
7561 E11
7562 D10
7564 C11
7580 A9
9500 C2
9501 C2
9502 C3
9503 B6
9506 C4
9507 C4
9508 C4
9509 C4
F501 A3
F502 A3
F503 C3
F504 C3
F505 C3
F506 C3
F507 C7
F508 C7
F509 D8
F510 B11
F511 C11
F512 C10
F513 D10
F514 B11
F515 E10
F516 E10
F517 G9
F518 E11
F519 G10
F520 G11
F521 D11
F522 A7
F523 B10
F524 D10
I501 C2
I502 D2
I503 B7
I504 C7
I505 D2
I506 C6
I507 F2
I508 F2
I510 E6
I511 E7
I512 E7
I513 D7
I514 D7
I515 F9
I516 B6
I517 F10
I518 E10
I519 F11
I520 C9
I521 C10
I522 D10
I523 F7
I524 F7
I525 A11
I526 G8
I528 E6
I529 D8
I530 B9
I531 G9
I532 D8
I533 D8
I534 A5
I535 G11
I536 C10
I537 A11
I538 F11
I539 F11
I540 D9
I541 E9
I542 C9
I543 C3
I544 C3
I545 D8
I546 C8
I547 C11
I548 C11
I550 D5
I551 D8
I552 C11

Large Signal Panel: Line Deflection



0220 B3	5400 F5	I453 E10
0221 B7	5401 F5	I454 E10
1400 C5	5445 B7	I455 E10
2400 F4	5450 B2	I456 C6
2401 G5	5451 A6	I457 C7
2402 G4	5452 D5	I458 D9
2404 H6	5457 C7	I459 D2
2405 D3	5461 E4	I460 D3
2415 E3	5463 E7	I461 D6
2420 C4	5464 E7	I462 D2
2421 B4	5465 E7	I463 D3
2422 B4	5480 E9	I464 D9
2423 B4	6400 F3	I467 D7
2441 F9	6401 F5	I468 D6
2443 F11	6444 F9	I469 E9
2444 G9	6445 F10	I470 C9
2448 B9	6447 F8	I473 E6
2450 A5	6448 G10	I474 F7
2451 A6	6449 B10	I475 E8
2452 B3	6452 B4	I476 D9
2453 C6	6453 F11	I477 D10
2454 C5	6460 D5	I479 F5
2455 D3	6461 E5	I480 F6
2456 D7	6462 F3	I481 G10
2457 D7	6464 C3	I483 G6
2458 D7	6465 D6	I484 F8
2459 C7	6466 D6	I485 F8
2460 D2	6467 C3	I486 D6
2461 E2	6468 C2	I487 F9
2462 E5	6481 E10	I488 G10
2463 E5	6482 E11	I489 G9
2464 F7	6483 C10	I490 F10
2465 D5	6484 A10	I491 F11
2466 E5	6485 C9	I492 F10
2467 E5	6486 D9	I494 D9
2468 E6	6487 D9	
2469 E7	6488 E9	
2470 E6	7400 G4	
2480 D9	7441 F10	
2481 D9	7443 G10	
2482 A9	7444 C5	
2483 A10	7450 F10	
2484 E6	7460 D4	
2485 C10	7461 D3	
2486 D9	7462 E2	
2487 D10	7463 E3	
2488 D10	7480 E10	
2489 D11	7482 D11	
2490 C6	9420 B3	
2491 E9	9451 A6	
3400 F4	9453 A6	
3401 F4	9460 E7	
3402 F4	9461 E6	
3403 G4	9462 E6	
3404 G4	9463 F6	
3405 H5	9464 F7	
3406 H5	F401 G4	
3407 H5	F441 A9	
3408 G6	F442 B5	
3410 G5	F443 E7	
3411 F5	F444 B3	
3441 F11	F445 B7	
3442 F10	F446 E9	
3443 F11	F447 C11	
3445 F9	F448 B7	
3446 F9	F449 C3	
3447 E10	F450 E4	
3448 E11	F451 C11	
3449 E11	F452 D11	
3450 D10	F453 D4	
3451 F8	F454 G8	
3452 G9	F455 D11	
3453 G10	F457 E4	
3454 G10	F458 E4	
3455 D10	F460 E2	
3456 F10	F462 E11	
3457 F11	F464 G11	
3458 C7	F467 B7	
3459 D6	F468 A5	
3460 C11	F469 B7	
3463 D4	I401 F3	
3465 A9	I402 F4	
3466 A10	I404 G5	
3467 A10	I405 G4	
3468 F3	I436 F5	
3469 B10	I437 D3	
3481 C9	I438 C4	
3482 C9	I439 C5	
3483 B11	I440 D3	
3484 C10	I441 C9	
3485 A7	I442 A6	
3486 A7	I443 C10	
3487 A6	I444 A7	
3488 D9	I445 A10	
3489 C4	I446 A7	
3490 B9	I447 B10	
3491 D3	I448 B10	
3492 D2	I449 B9	
3493 D3	I450 A10	
3494 C9	I451 C9	
4464 C3	I452 D9	

Large Signal Panel: Frame Deflection



Diversity Table A2

ITEM	REGION TUBE													
	AP PH NO EW 32"	AP/CH PH EW 29SF CH	AP/CH PH EW 25"	AP PH EW 29" FSQ	AP/CH SGMK EW 29" RF	AP/CH SMGK EW 25" RF CH	AP/CH SMGK EW 25" RF	AP/CHINA BMCC EW 21" RF CHINA	AP SMGK EW 29RF AP	AP/CH MATJ EW 21RF	THAI PH EW 29FS	CH PH EW 29N	AU SMGK EW 29RF
1400	---	---	---	---	---	---	---	---	---	---	---	---	---
2401	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2	50V 2u2
2402	470p	470p	470p	470p	470p	470p	470p	470p	470p	470p	470p	470p	470p
2404	47u	47u	47u	47u	47u	47u	47u	47u	47u	47u	47u	47u	47u
2420	---	---	---	---	---	---	---	---	---	---	---	---	---
2421	---	---	---	---	---	---	---	---	---	---	---	---	---
2448	---	---	---	---	---	---	---	---	---	---	---	---	---
2451	---	---	---	---	---	---	---	---	---	---	15n	---	---
2454	---	---	---	---	---	---	---	---	---	---	---	---	---
2456	---	---	---	---	---	---	---	---	---	---	---	---	---
2457	470n	560n	390n	390n	360n	390n	390n	270n	360n	270n	560n	680n	360n
2458	2u2	2u2	2u2	2u2	2u2	2u2	2u2	2u2	2u2	2u2	2u2	2u2	2u2
2462	---	---	---	---	---	---	---	---	---	---	---	---	---
2463	2n2	820p	820p	820p	2n2	1n5	1n5	220p	2n2	220p	680p	3n3	2n2
2464	2u2	---	---	2u2	2u2	2u2	2u2	2u2	2u2	2u2	2u2	---	2u2
2465	15n	15n	13n	13n	15n	15n	15n	9n1	15n	9n1	12n	15n	15n
2466	---	10n	---	---	---	---	---	---	---	---	---	---	---
2467	22n	---	10n	33n	22n	15n	15n	22n	22n	22n	22n	---	22n
2468	15n	15n	33n	18n	15n	18n	18n	15n	15n	15n	18n	33n	15n
2469	---	560n	---	---	---	---	---	---	---	---	---	560n	---
2482	68n	68n	68n	68n	120n	68n	68n	68n	120n	68n	68n	120n	120n
2484	---	---	470n	---	---	---	---	---	---	---	---	---	---
2490	---	---	---	---	---	---	---	---	---	---	---	---	---
3400	330R	330R	330R	330R	330R	330R	330R	330R	330R	330R	330R	330R	330R
3401	33K	33K	33K	33K	33K	220K	220K	22K	33K	22K	33K	33K	33K
3403	100K	100K	100K	100K	100K	82K	82K	100K	100K	100K	100K	100K	100K
3404	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K
3405	4R7	4R7	4R7	4R7	4R7	10R	10R	4R7	4R7	4R7	10R	4R7	4R7
3406	4R7	4R7	4R7	4R7	4R7	10R	10R	4R7	4R7	4R7	10R	4R7	4R7
3407	---	---	---	---	---	---	---	---	---	---	---	---	---
3408	100R	100R	100R	100R	100R	100R	100R	100R	100R	100R	100R	100R	100R
3410	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K
3411	4R7	4R7	4R7	4R7	4R7	4R7	4R7	4R7	4R7	4R7	4R7	4R7	4R7
3447	180R	180R	180R	180R	180R	180R	180R	180R	180R	180R	180R	180R	180R
3448	820R	820R	820R	820R	820R	820R	820R	820R	820R	820R	820R	820R	820R
3452	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K
3454	15K	15K	15K	15K	15K	15K	15K	15K	15K	15K	15K	15K	15K
3468	180R	---	100R	180R	100R	180R	180R	---	100R	---	---	100R	100R
3481	15K	15K	27K	12K	15K	10K	10K	15K	15K	15K	15K	15K	15K
3482	10K	10K	10K	12K	8K2	15K	15K	12K	8K2	12K	10K	10K	8K2
3486	---	---	---	---	---	---	---	---	---	---	33R	---	---
3489	---	---	---	---	---	---	---	---	---	---	---	---	---
3490	8K2	8K2	1K2	8K2	8K2	8K2	8K2	8K2	8K2	8K2	8K2	8K2	8K2
3491	10K	27K	10K	10K	10K	10K	10K	10K	10K	10K	27K	27K	10K
3492	470R	1K	1K	1K	1K	470R	470R	1K	1K	1K	6K8	1K	1K
3493	2R2	6R8	6R8	6R8	6R8	6R8	6R8	6R8	6R8	6R8	6R8	6R8	6R8
5400	---	30531	30531	---	---	---	---	---	---	---	---	94849	---
5401	1000u	---	---	71020	71020	1000u	1000u	1000u	1000u	1000u	1000u	---	1000u
5445	02472	02469	02467	02468	02472	02471	02471	02471	02472	02471	02468	02472	02472
5451	---	---	---	---	---	---	---	---	---	---	33u	---	---
5457	53201	53201	53111	94865	53201	53181	53181	56801	53201	56801	94865	94865	53201
5461	02478	02465	02465	02465	02465	02465	02465	02466	02465	02446	02465	02465	02465
5463	37021	---	---	37021	37021	37021	37021	00048	37021	00048	02339	---	37021
5464	---	34901	---	---	---	---	---	---	---	---	---	---	---
5465	---	---	34011	---	---	---	---	---	---	---	---	02319	---
5480	LAL04 33U	LAL04 56u	LAL04 56u	LAL04 47u	LAL04 18U	LAL04 39u	LAL04 39u	LAL04 33u	LAL04 18u	LAL04 33u	LAL04 47u	LAL04 33u	LAL04 18u
6401	C39	C39	C39	C39	C39	C47	C47	C47	C39	C47	C39	C39	C39
6460	DG3-7005L	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24
6462	C10	---	C10	C10	C10	C10	C10	---	C10	---	---	C10	C10
9451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	---	YES	YES
9460	YES	---	---	YES	YES	YES	YES	YES	YES	YES	YES	---	YES
9462	---	YES	YES	---	---	---	---	---	---	---	---	YES	---
9463	YES	---	---	YES	YES	YES	YES	YES	YES	YES	YES	---	YES
9464	---	YES	YES	---	---	---	---	---	---	---	---	YES	---

ITEM	REGION TUBE												
	AP PH EW 32"	AP/CH PH EW 29SF CH	AP/CH PH EW 25"	AP PH EW 29" FSQ	AP/CH SGMK EW 29" RF	AP/CH SMGK EW 25" RF CH	AP/CH SMGK EW 25" RF	AP/CHINA BMCC EW 21" RF CHINA	AP SMGK EW 29RF AP	AP/CH MATJ EW 21RF	THAI PH EW 29FS	CH PH EW 29N	AU SMGK EW 29RF
3470	150K	330K	150K	330K	330K	470K	470K	470K	470K	270K	470K	470K	470K
3471	4R7	2R2	4R7	3R3	3R9	3R3	3R3	5R6	3R9	6R8	2R2	3R3	3R9
3472	2R2	2R2	2R2	3R3	3R9	3R3	3R3	5R6	3R9	6R8	2R2	3R3	3R9
3473	3R3	2R2	2R2	3R3	2R2	3R3	3R3	5R6	2R2	6R8	2R2	3R3	2R2
5471	3u3	3u3	3u3	3u3	3u3	6u8	6u8	---	3u3	3u3	3u3	3u3	3u3
5472	3MUH3	3MUH3	3MUH3	3MUH3	3MUH3	6MUH8	6MUH8	---	3MUH3	3MUH3	3MUH3	3MUH3	3MUH3

CL 16532101_004.eps
230801

0222 B10
2471 A7
2472 B8
2473 A9
2474 B5
2475 C5
2476 A9
3470 A8
3471 C9
3472 C9
3473 C9
3474 B6
3475 C6
3477 B9
3478 B9
3479 C9
3480 B9
3495 A9
3496 B9
3497 B9
3498 A6
5471 B9
5472 A9
6470 A10
6476 B8
7471 A6
9471 B9
F403 B10
F404 B10
F405 B10
F406 B10
F407 C7
F408 B5
F409 B5
I408 A9
I409 A8
I410 A5
I411 C8
I412 C8
I413 B8
I414 B9
I415 A9
I416 A9
I417 A10
I418 C5

Large Signal Panel: Tuner IF

A4 TUNER IF

ITEM	AP/CH 38.9/38.0				LA/NA/AP 45.75	
	FM Radio		LNA	Non-LNA & Non FM Radio	LNA	Non-LNA
	Stereo	Mono				
1000	UR1316R	UR1316R	UV1356A	TEDE9-228A	UV1336A	ENV56D98G3 TEDH9-200A
3010	300R	Jmp	---	---	---	---
3011	---	330R	---	---	---	---
5001	47u	47u	47u	47u	5u6	5u6
5002	---	---	820n	820n	820n	820n

ITEM	BGIDKM AP	MN NA/LA/AP	BG AP	BGIDKM CH
1002	K7257M	F072TPL	G1986M	---
1003	---	---	---	K6274K
1004	K9362M	---	---	K9352M
2003	10n	---	---	10n
3006	2K2	---	---	2K2
3007	2K2	---	---	2K2
3008	2K2	---	---	2K2
4001	---	Jmp	Jmp	---
4002	---	Jmp	Jmp	Jmp
4003	Jmp	---	---	Jmp
4004	Jmp	---	---	---
4012	Jmp	---	---	Jmp
5003	1n8	---	---	1n8
6004	BA792	---	---	BA792
7001	PCTC124ET	---	---	PCTC124ET

ITEM	CVI	W/O CVI
9993	---	YES
9997	---	YES
6006	YES	---
6007	YES	---

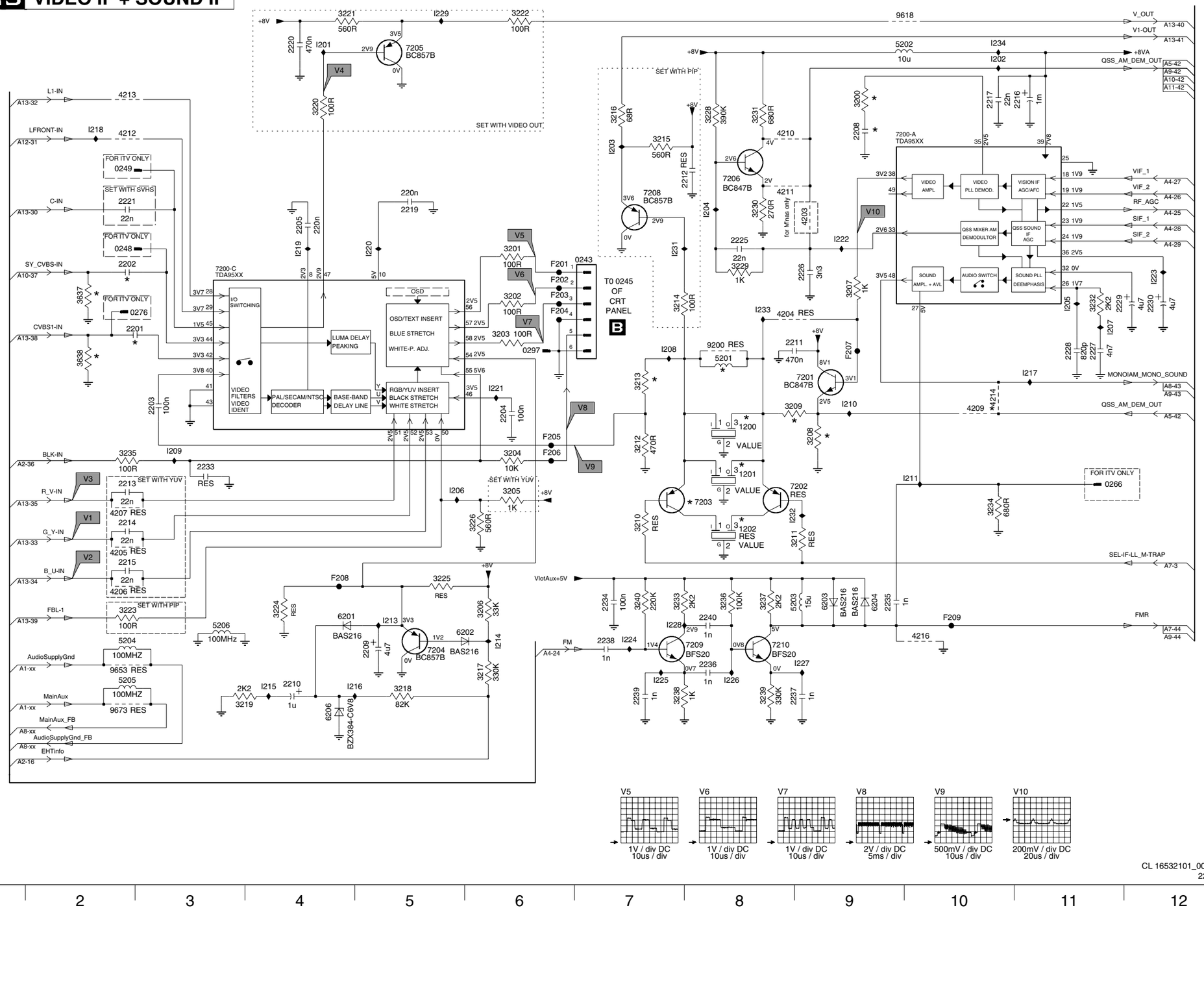
I1: 2V / div DC, 200us / div
I2: 2V / div DC, 200us / div
I3: 500mV / div DC, 10us / div
I4: 20mV / div DC, 10us / div

CL 16532101_005.eps
230801

0265 A5
0283 C3
0285 B3
1000 B4
1002 D8
1003 E8
1004 F8
2001 D4
2002 D5
2003 D6
2004 B6
2005 B6
2006 B7
2007 B7
2008 C6
2009 C9
2010 B5
3000 C4
3001 C4
3002 C7
3003 B8
3004 C8
3005 C8
3006 E6
3007 D6
3008 D6
3009 D7
3010 D4
3011 D5
4001 D6
4002 F8
4003 E7
4004 E8
4005 E7
4006 E6
4011 F8
4012 G8
5001 B7
5002 C6
5003 F9
6001 B6
6002 C7
6003 C7
6004 E6
6005 E7
6006 F5
6007 F5
7001 F6
7002 F7
9001 D7
9993 F5
9997 F5
F001 B6
F002 B6
F003 B5
F004 C6
F005 B4
F006 C9
F007 C4
F009 F4
F010 A5
I001 C4
I002 C4
I003 D6
I005 B5
I006 E7
I007 D7
I008 D8
I009 E8
I010 F8
I011 C8
I013 F9
I014 F9
I016 B6
I018 F7

Large Signal Panel: Video IF + Sound IF

A5 VIDEO IF + SOUND IF



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220801

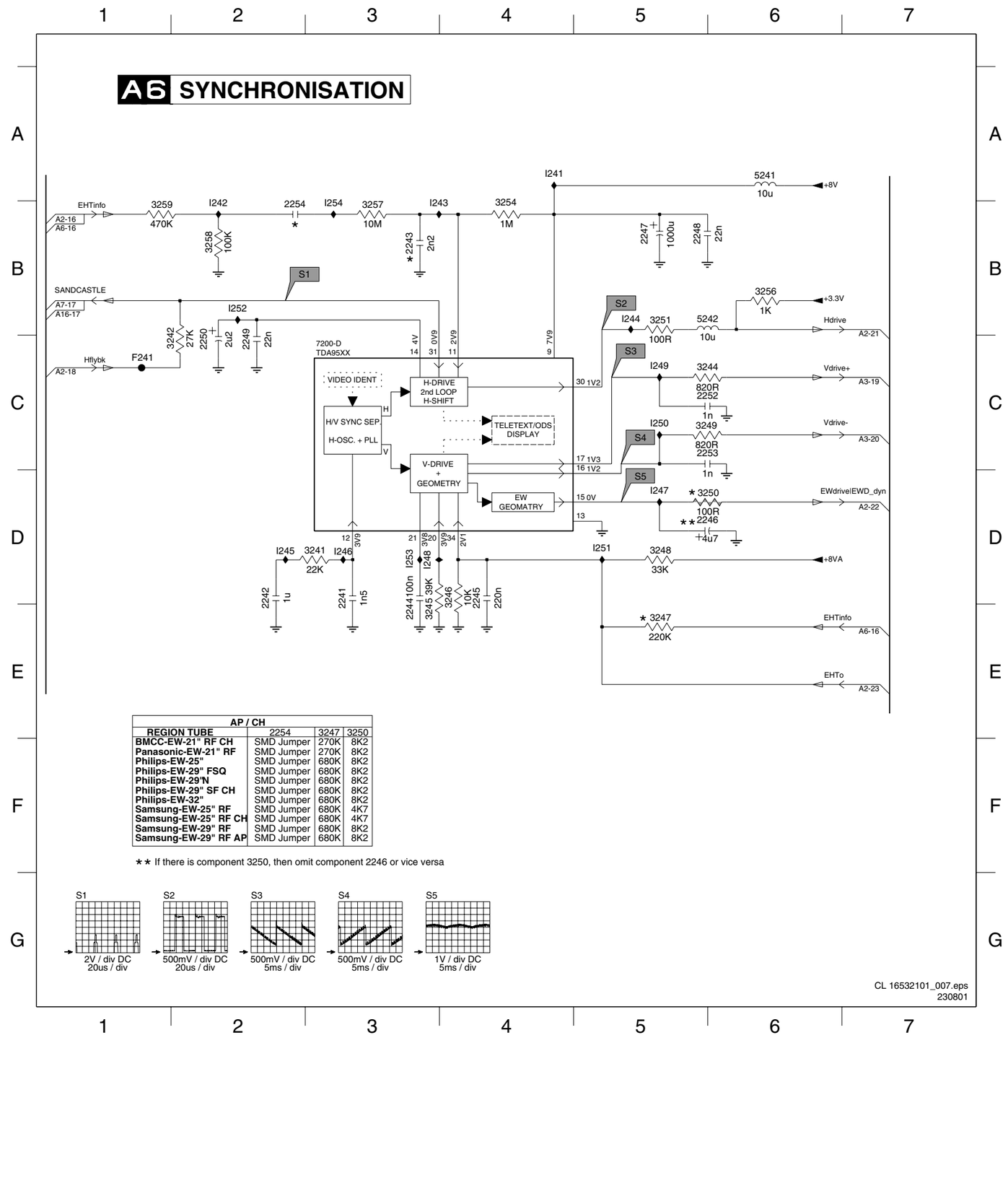
0243 C7 6201 F4
0248 C2 6202 F6
0249 B2 6203 F9
0266 E11 6204 F9
0276 D3 6206 G4
0297 D6 7200-A B10
1200 E8 7200-C C3
1201 E8 7201 D9
1202 F8 7202 E9
2201 D2 7203 E8
2202 C2 7204 G5
2203 D3 7205 A5
2204 D6 7206 B8
2205 C4 7208 B7
2208 B9 7209 G8
2209 G5 7210 G8
2210 G4 9200 D8
2211 D8 9618 A10
2212 B8 9653 G2
2213 E2 9673 G2
2214 E2 F201 C6
2215 F2 F202 C6
2216 B11 F203 C6
2217 B10 F204 D6
2219 C5 F205 E6
2220 A4 F206 E6
2221 C2 F207 D9
2225 C8 F208 F4
2226 C9 F209 F10
2227 D11 I201 A4
2228 D11 I202 A10
2229 C11 I203 B7
2230 C12 I204 C8
2233 E3 I205 C11
2234 F7 I206 E5
2235 F9 I207 D11
2236 G8 I208 D7
2237 G9 I209 E3
2238 G7 I210 D9
2239 G7 I211 E10
2240 F8 I213 F5
3200 B9 I214 G6
3201 C6 I215 G4
3202 C6 I216 G4
3203 D6 I217 D11
3204 E6 I218 B2
3205 E6 I219 C4
3206 F6 I220 C5
3207 C9 I221 D6
3208 E9 I222 C9
3209 D8 I223 C12
3210 E7 I224 G7
3211 F9 I225 G7
3212 E7 I226 G8
3213 D7 I227 G9
3214 C7 I228 F7
3215 B7 I229 A5
3216 B7 I231 C7
3217 G6 I232 E8
3218 G5 I233 D8
3219 G3 I234 A10
3220 B4
3221 A4
3222 A6
3223 F2
3224 F4
3225 F5
3226 E6
3228 B8
3229 C8
3230 C8
3231 B8
3232 C11
3233 F7
3234 E10
3235 E2
3236 F8
3237 F8
3238 G7
3239 G8
3240 F7
3637 C2
3638 D2
4203 C9
4204 D9
4205 F2
4206 F2
4207 E2
4209 D10
4210 B8
4211 B8
4212 B2
4213 B2
4214 D10
4216 G10
5201 D8
5202 A9
5203 F9
5204 G2
5205 G2
5206 F3

Large Signal Panel: Synchronisation

Diversity Table A5

ITEM	BG/DK	BG/I/DK/M	M	BG	BG/DK/M-IN	BG/I/DK/M-CH
1200	04B	6M	4M5	04B	6M	6M
1201	6M5	---	---	---	---	---
2208	100n	100n	100N	100N	10N	100N
3200	390R	390R	390R	390R	1K8	390R
3208	220R	390R	220R	330R	390R	390R
3209	82R	100R	68R	100R	100R	82R
3213	470R	560R	560R	470R	560R	560R
5201	4u7	4u7	6U8	4U7	4U7	6U8

ITEM	1x Rear Video In	1x Rear Video in with SVHS / 1x Side Video In	2x Rear Video In	2x Rear Video In with Side Video In	No Video Inputs
2201	100n	x	100n	100n	x
2202	x	100n	100n	100n	x
3637	x	75R	75R	x	x
3638	75R	x	75R	75R	x

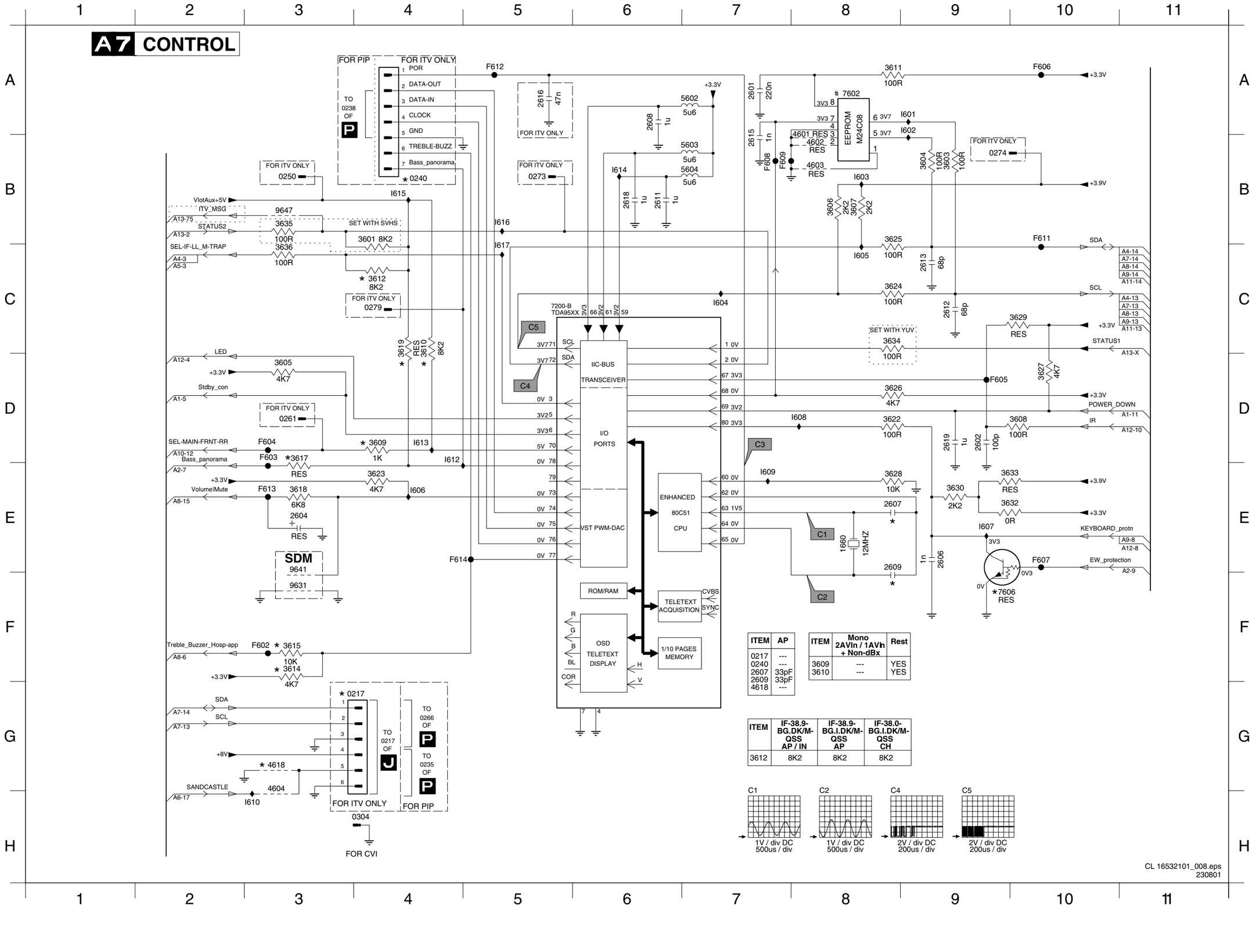


AP / CH			
REGION TUBE	2254	3247	3250
BMCC-EW-21" RF CH	SMD Jumper	270K	8K2
Panasonic-EW-21" RF	SMD Jumper	270K	8K2
Philips-EW-25"	SMD Jumper	680K	8K2
Philips-EW-29" FSQ	SMD Jumper	680K	8K2
Philips-EW-29"N	SMD Jumper	680K	8K2
Philips-EW-29" SF CH	SMD Jumper	680K	8K2
Philips-EW-32"	SMD Jumper	680K	8K2
Samsung-EW-25" RF	SMD Jumper	680K	4K7
Samsung-EW-25" RF CH	SMD Jumper	680K	4K7
Samsung-EW-29" RF	SMD Jumper	680K	8K2
Samsung-EW-29" RF AP	SMD Jumper	680K	8K2

** If there is component 3250, then omit component 2246 or vice versa

Large Signal Panel: Control

A7 CONTROL



ITEM	AP
0217	---
0240	---
2607	33pF
2609	33pF
4618	---

ITEM	Mono 2AVIn / 1AVh + Non-dBx	Rest
3609	---	YES
3610	---	YES

ITEM	IF-38.9-BG.DK/M-QSS AP / IN	IF-38.9-BG.I.DK/M-QSS AP	IF-38.0-BG.I.DK/M-QSS CH
3612	8K2	8K2	8K2

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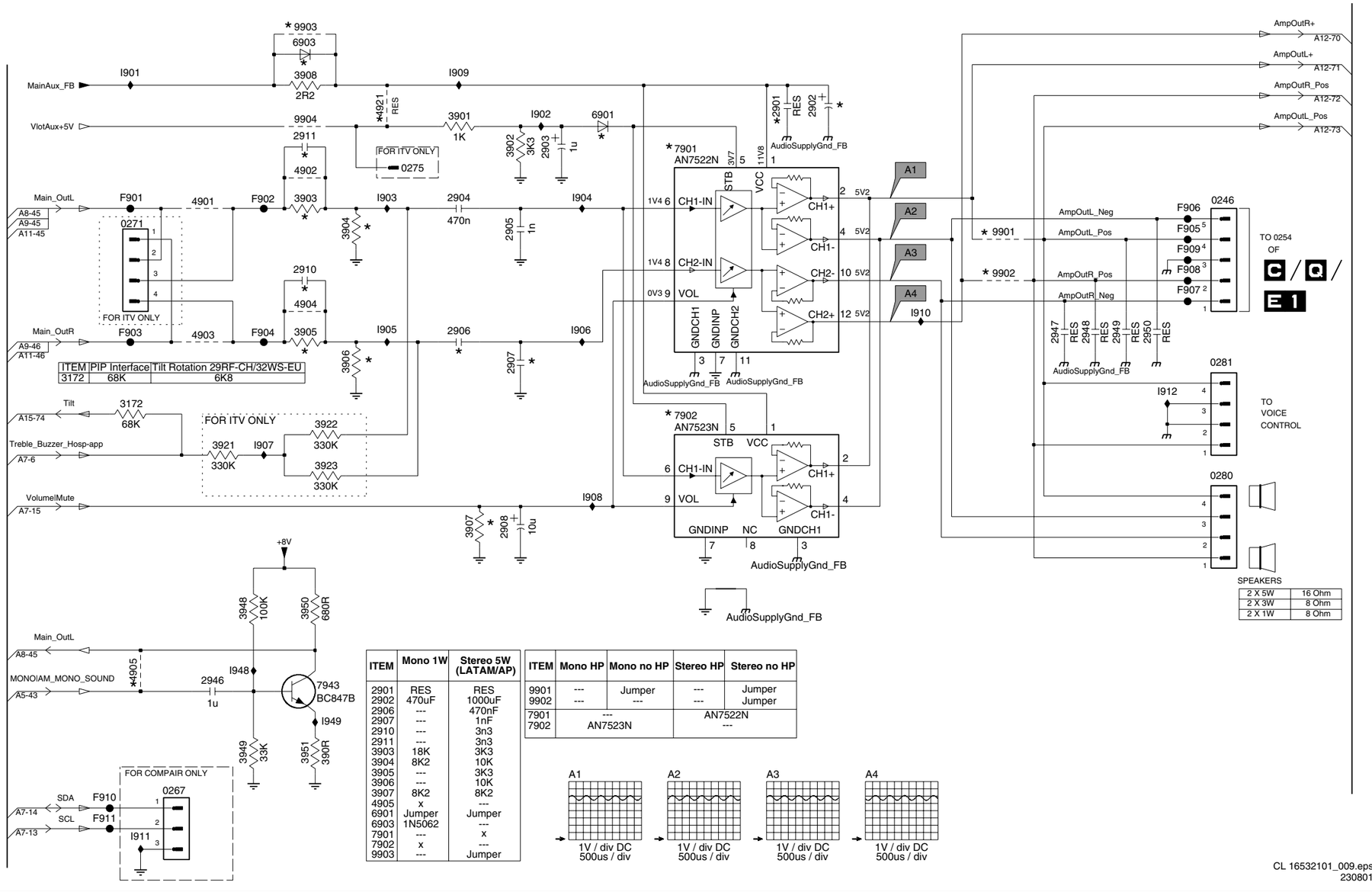
230801

0217 G3
0240 B4
0250 B3
0261 D3
0273 B5
0274 B9
0279 C4
0304 H3
1660 E8
2601 A7
2602 D9
2604 E3
2606 E9
2607 E8
2608 A6
2609 E8
2611 B6
2612 C9
2613 C9
2615 B7
2616 A5
2618 B6
2619 D9
3601 B4
3603 B9
3604 B9
3605 D3
3606 B8
3607 B8
3608 D10
3609 D4
3610 C4
3611 A8
3612 C4
3614 F3
3615 F3
3617 D3
3618 E3
3619 C4
3622 D8
3623 E4
3624 C8
3625 B8
3626 D8
3627 D10
3628 E8
3629 C10
3630 E9
3632 E9
3633 E9
3634 C8
3635 B3
3636 C3
4601 B8
4602 B8
4603 B8
4604 H3
4618 G3
5602 A7
5603 B7
5604 B7
7200-B C5
7602 A8
7606 F10
9631 F3
9641 F3
9647 B3
F602 F3
F603 D3
F604 D3
F605 D9
F606 A10
F607 E10
F608 B7
F609 B7
F611 B10
F612 A5
F613 E3
F614 E4
I601 A9
I602 A9
I603 B8
I604 C7
I605 C8
I606 E4
I607 E9
I608 D8
I609 E7
I610 H3
I612 D4
I613 D4
I614 B6
I615 B4
I616 B5
I617 C5

Large Signal Panel: Audio Amplifier

A8 AUDIO_AMPLIFIER



ITEM	PIP Interface	Tilt Rotation 29RF-CH/32WS-EU
3172	68K	6K8

ITEM	Mono 1W	Stereo 5W (LATAM/AP)
2901	RES	RES
2902	470uF	1000uF
2906	---	470nF
2907	---	1nF
2910	---	3n3
2911	---	3n3
3903	18K	3K3
3904	8K2	10K
3905	---	3K3
3906	---	10K
3907	8K2	8K2
4905	x	---
6901	Jumper	Jumper
6903	1N5062	---
7901	---	x
7902	x	---
9903	---	Jumper

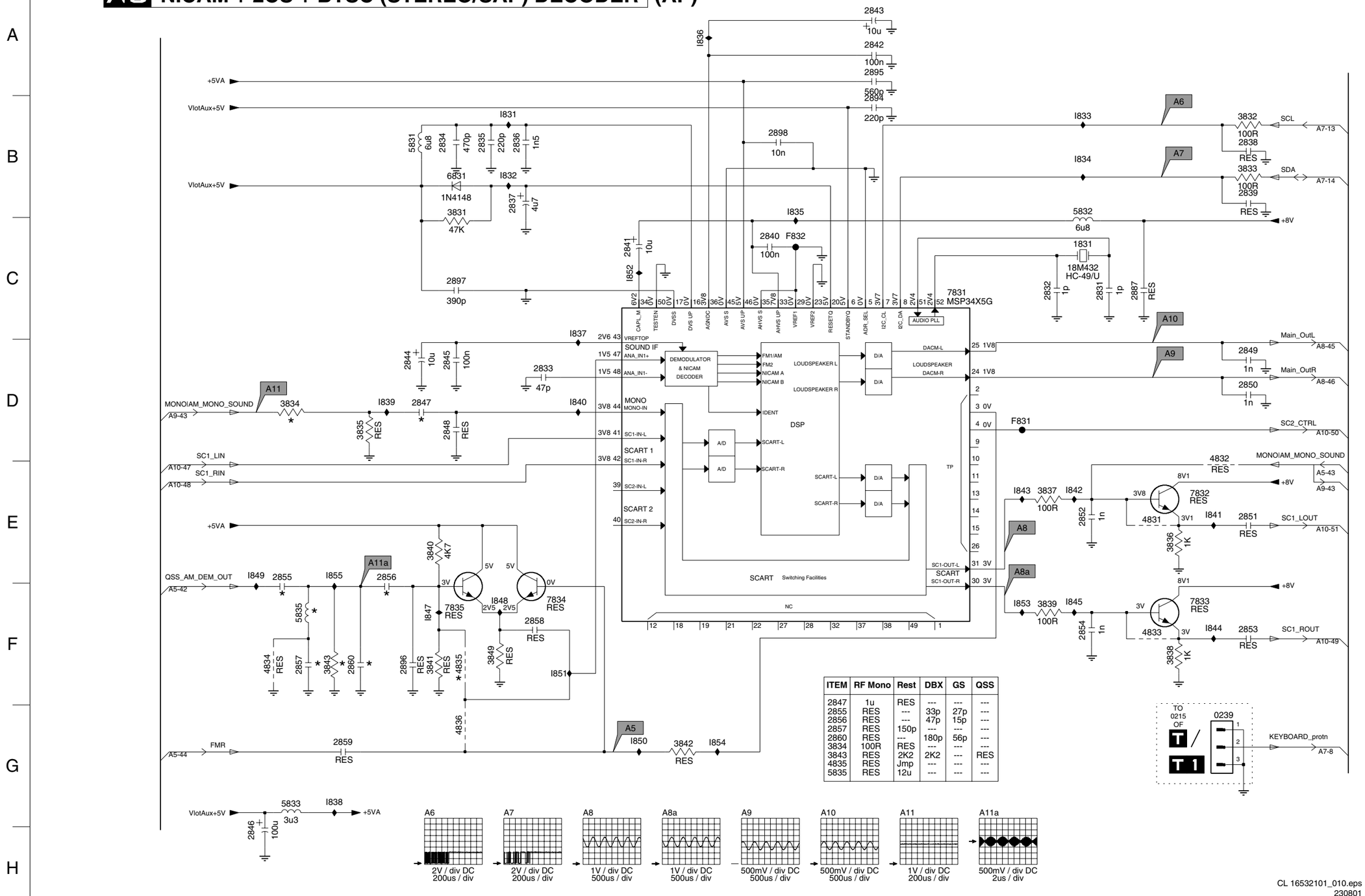
ITEM	Mono HP	Mono no HP	Stereo HP	Stereo no HP
9901	---	Jumper	---	Jumper
9902	---	---	---	Jumper
7901	---		AN7522N	
7902	AN7523N		---	

SPEAKERS	
2 X 5W	16 Ohm
2 X 3W	8 Ohm
2 X 1W	8 Ohm

0246 C10
0267 G3
0271 C3
0275 B5
0280 E10
0281 D10
2901 B7
2902 B8
2903 B6
2904 C5
2905 C5
2906 D5
2907 D5
2908 E5
2910 C4
2911 B4
2946 F3
2947 D9
2948 D9
2949 D10
2950 D10
3172 D3
3901 B5
3902 B5
3903 C4
3904 C4
3905 D4
3906 D4
3907 E5
3908 B4
3921 D3
3922 D4
3923 E4
3948 F4
3949 G4
3950 F4
3951 G4
4901 C3
4902 C4
4903 D3
4904 C4
4905 F3
4921 B5
6901 B6
6903 B4
7901 B7
7902 D7
7943 F4
9901 C9
9902 C9
9903 B4
9904 B4
F901 C3
F902 C4
F903 D3
F904 D4
F905 C10
F906 C10
F907 C10
F908 C10
F909 C10
F910 G3
F911 G3
I901 B3
I902 B6
I903 C5
I904 C6
I905 D5
I906 D6
I907 D4
I908 E6
I909 B5
I910 C8
I911 G3
I912 D10
I948 F4
I949 F4

Large Signal Panel: NICAM + 2CS + BTSC (Stereo / SAP Decoder)

A9 NICAM + 2CS + BTSC (STEREO/SAP) DECODER (AP)



ITEM	RF Mono	Rest	DBX	GS	QSS
2847	1u	RES	---	---	---
2855	RES	---	33p	27p	---
2856	RES	---	47p	15p	---
2857	RES	150p	---	---	---
2860	RES	---	180p	56p	---
3834	100R	RES	---	---	---
3843	RES	2K2	2K2	---	RES
4835	RES	Jmp	---	---	---
5835	RES	12u	---	---	---

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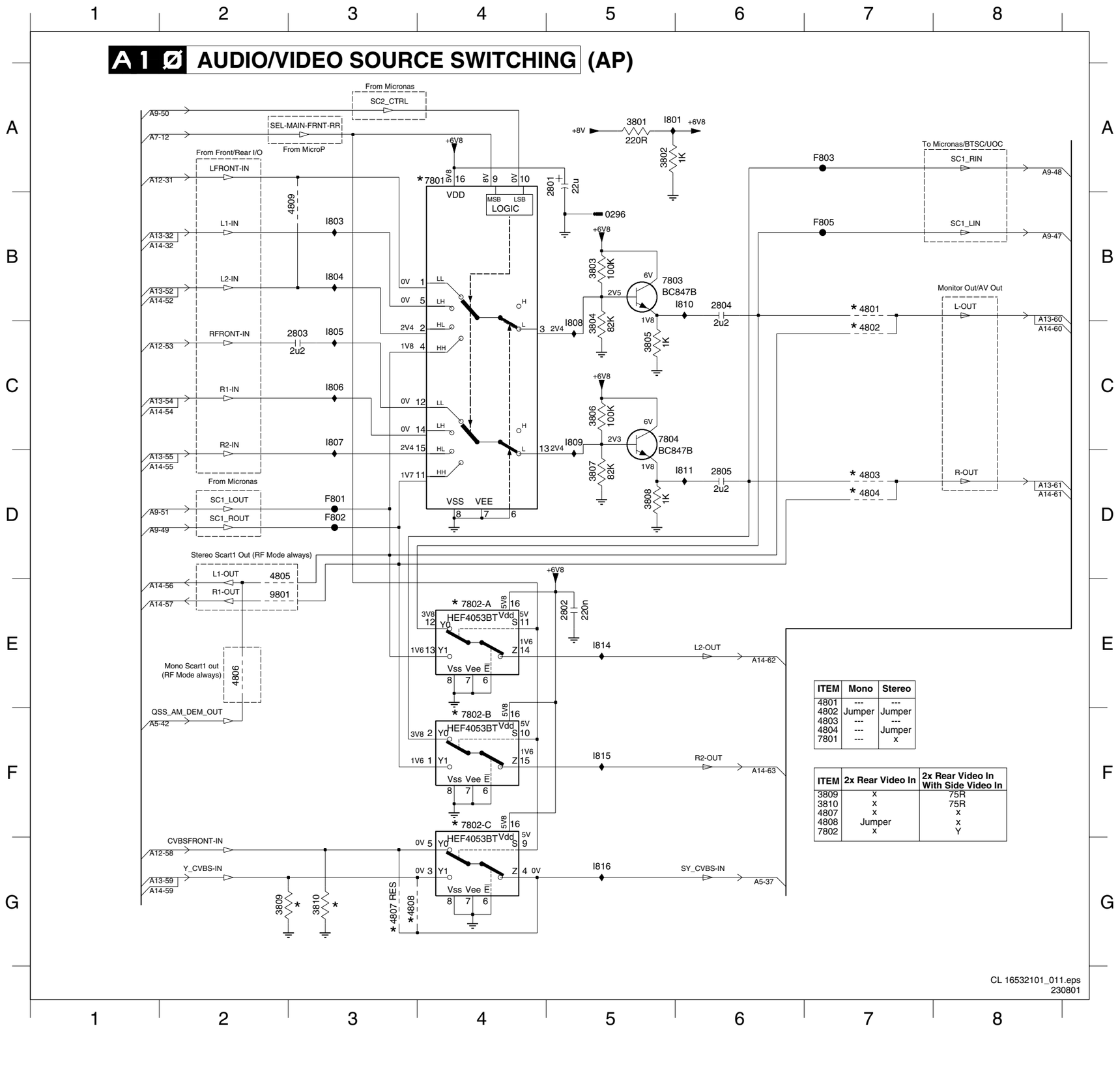
230801

0239 G10
1831 C9
2831 C9
2832 C9
2833 D5
2834 B4
2835 B4
2836 B5
2837 B4
2838 B10
2839 B10
2840 C7
2841 C5
2842 A7
2843 A7
2844 D4
2845 D4
2846 H2
2847 D4
2848 D4
2849 D10
2850 D10
2851 E10
2852 E9
2853 F10
2854 F9
2855 E3
2856 E3
2857 F3
2858 F5
2859 G3
2860 F3
2887 C10
2894 B7
2895 A7
2896 F4
2897 C4
2898 B7
3831 B4
3832 B10
3833 B10
3834 D3
3835 D3
3836 E10
3837 E9
3838 F10
3839 F9
3840 E4
3841 F4
3842 G6
3843 F3
3849 F4
4831 E10
4832 E10
4833 F10
4834 F2
4835 F4
4836 G4
5831 B4
5832 B9
5833 G3
5835 F3
6831 B4
7831 C8
7832 E10
7833 F10
7834 F5
7835 F4
F831 D9
F832 C7
I831 B4
I832 B4
I833 B9
I834 B9
I835 B7
I836 A6
I837 C5
I838 G3
I839 D3
I840 D5
I841 E10
I842 E9
I843 E9
I844 F10
I845 F9
I847 F4
I848 F4
I849 E2
I850 G5
I851 F5
I852 C5
I853 F9
I854 G6
I855 E3

Large Signal Panel: Audio / Video Source Switching

A1 Ø AUDIO/VIDEO SOURCE SWITCHING (AP)



ITEM	Mono	Stereo
4801	---	---
4802	Jumper	Jumper
4803	---	---
4804	---	Jumper
7801	---	x

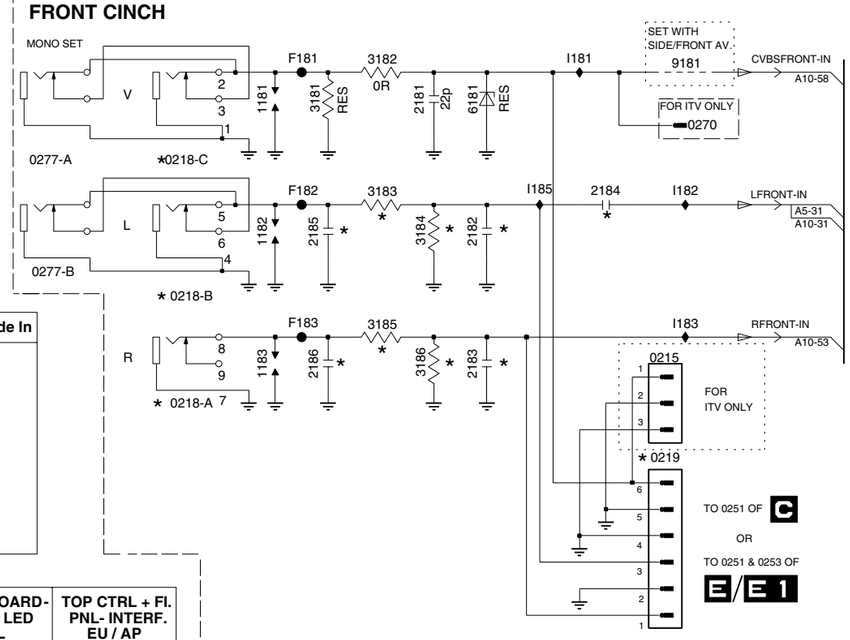
ITEM	2x Rear Video In	2x Rear Video In With Side Video In
3809	x	75R
3810	x	75R
4807	x	x
4808	Jumper	x
7802	x	Y

0296 B5
2801 A5
2802 E5
2803 C3
2804 B6
2805 D6
3801 A5
3802 A5
3803 B5
3804 C5
3805 C5
3806 C5
3807 D5
3808 D5
3809 G2
3810 G3
4801 B7
4802 C7
4803 D7
4804 D7
4805 E2
4806 E2
4807 G3
4808 G3
4809 B3
7801 B4
7802-A E4
7802-B F4
7802-C F4
7803 B5
7804 C5
9801 E2
E801 D3
E802 D3
E803 A7
E805 B7
I801 A5
I803 B3
I804 B3
I805 C3
I806 C3
I807 C3
I808 C5
I809 C5
I810 B6
I811 D6
I814 E5
I815 F5
I816 G5

Large Signal Panel: Front I/O + Front Control + Headphone

A12 FRONT IO + FRONT CONTROL + HEADPHONE

FRONT CINCH



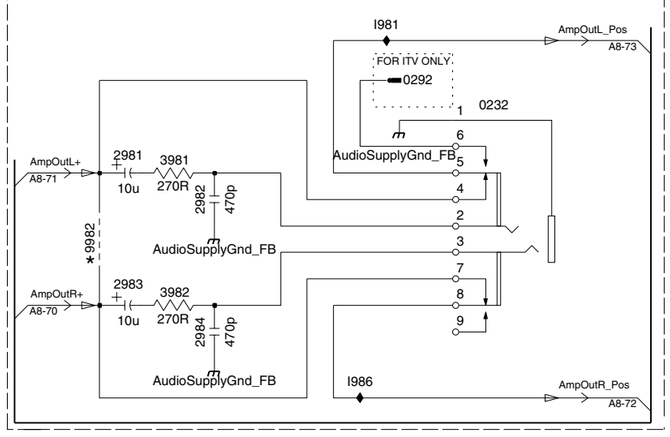
For Front Cinch

ITEM	Stereo Front In	Stereo Side In
0218	3-Pole	---
0219	---	Yes
2182	390p	---
2183	390p	---
2184	2u2	2u2
2185	390p	---
2186	390p	---
3183	150R	---
3184	47K	---
3185	150R	---
3186	47K	---

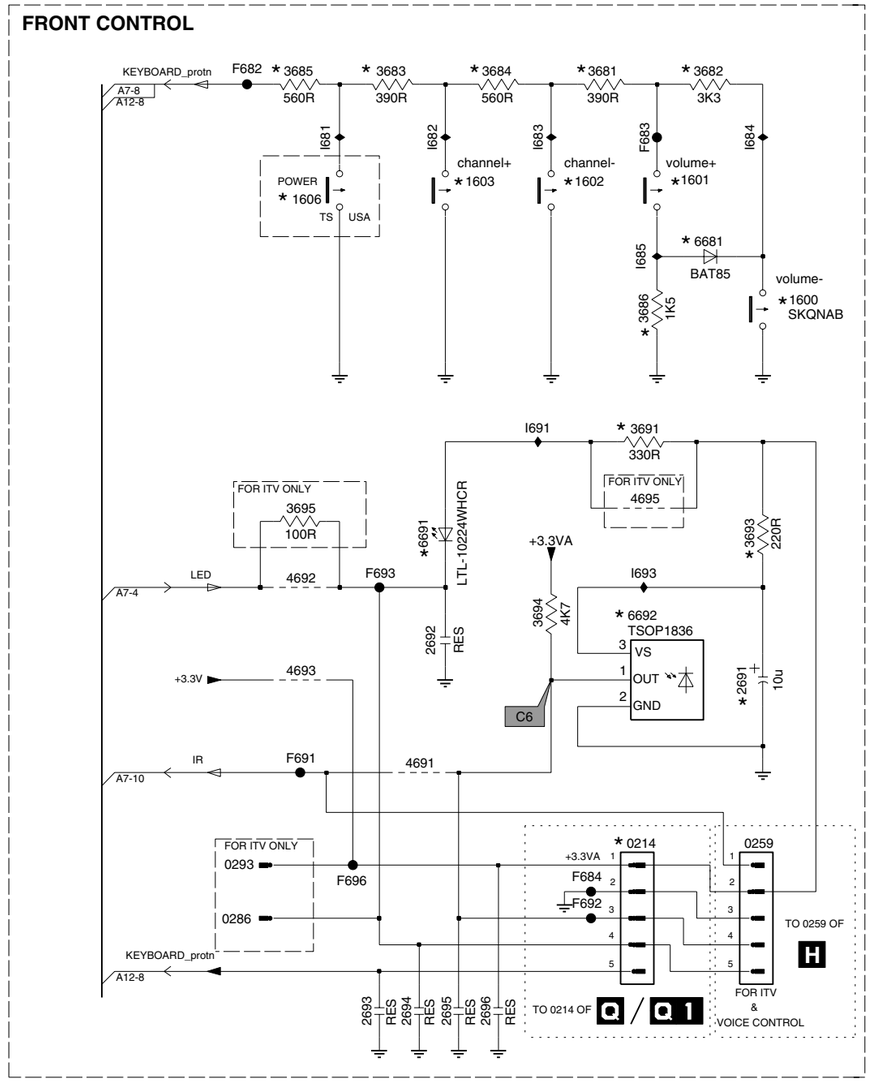
For Front Control

ITEM	FRNT INTERF. AP	IR+LED EU / AP	KEYBOARD-IR + LED GL	TOP CTRL + FI. PNL- INTERF. EU / AP
0214	YES	---	---	YES
1600	---	---	YES	---
1601	---	---	YES	---
1602	---	---	YES	---
1603	---	---	YES	---
1606	---	---	---	---
2691	---	YES	YES	---
3681	---	---	YES	---
3682	---	---	YES	---
3683	---	---	YES	---
3684	---	---	YES	---
3685	---	---	YES	---
3686	---	---	YES	---
3691	---	YES	YES	---
3693	---	YES	YES	---
6681	---	---	YES	---
6691	---	YES	YES	---
6692	---	YES	YES	---

HEADPHONE



FRONT CONTROL



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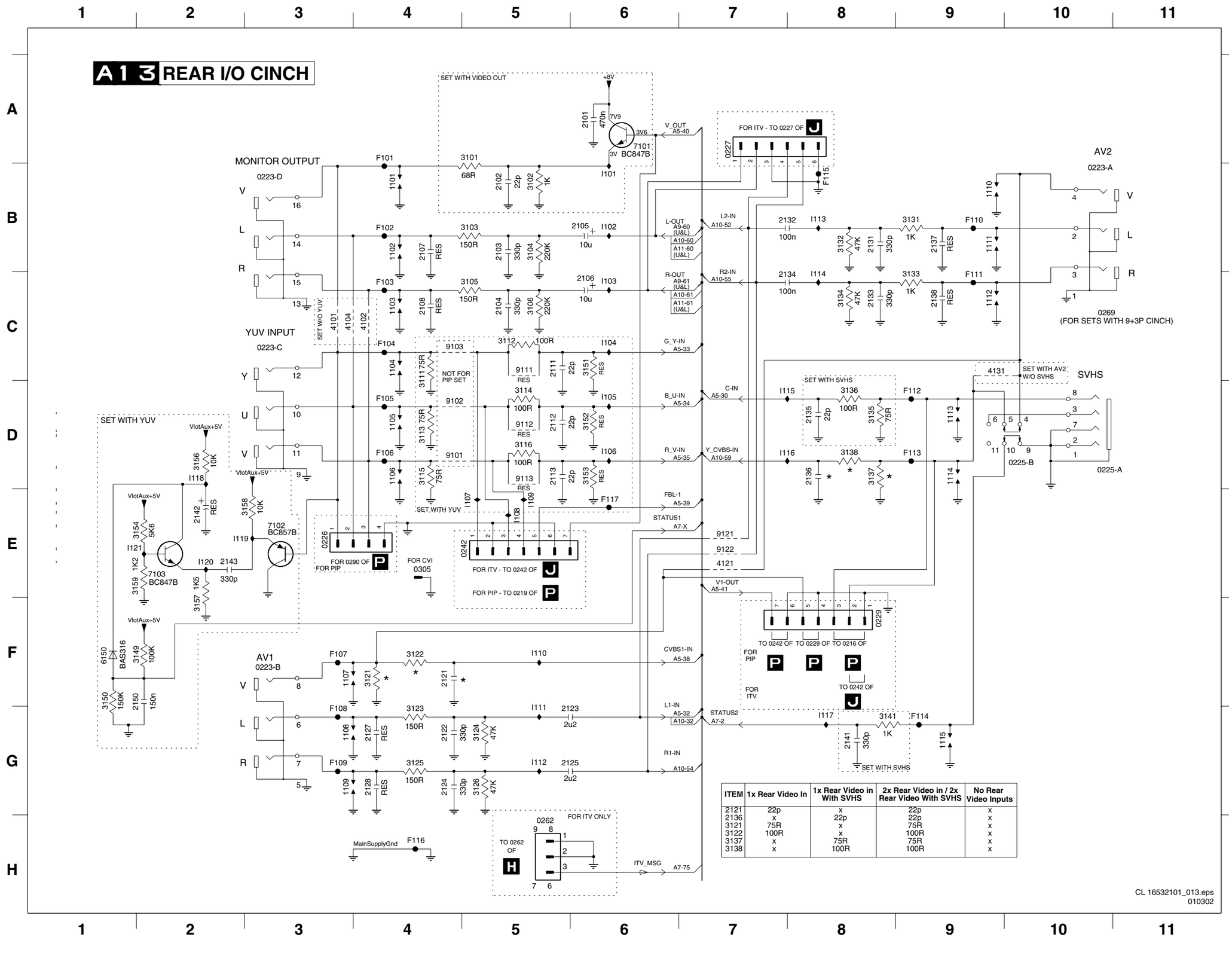
010302

0214 F10
0215 C5
0218-A C3
0218-B C3
0218-C B3
0219 D5
0232 F5
0259 F11
0270 B6
0277-A B2
0277-B C2
0286 F8
0292 F5
0293 F8
1181 B3
1182 B3
1183 C3
1600 C11
1601 B10
1602 B10
1603 B9
1606 B8
2181 B4
2182 B4
2183 C4
2184 B5
2185 B4
2186 C4
2691 E11
2692 E9
2693 G9
2694 G9
2695 G9
2696 G9
2981 F3
2982 F4
2983 G3
2984 G4
3181 B4
3182 B4
3183 B4
3184 B4
3185 C4
3186 C4
3681 B10
3682 B11
3683 B9
3684 B9
3685 B8
3686 C10
3691 C10
3693 D11
3694 D10
3695 D8
3981 F4
3982 G4
4691 E9
4692 D8
4693 E8
4694 H2
4695 D10
6181 B4
6681 B11
6691 D9
6692 D10
9181 B6
9982 F3
F181 B4
F182 B4
F183 C4
F682 A8
F683 B10
F684 F10
F691 E8
F692 F10
F693 D9
F694 H2
F695 H2
F696 F9
I181 B5
I182 B6
I183 C6
I185 B5
I681 B8
I682 B9
I683 B10
I684 B11
I685 C10
I691 C10
I693 D10
I981 E5

Large Signal Panel: Rear I/O Cinch

A13 REAR I/O CINCH



ITEM	1x Rear Video In	1x Rear Video in With SVHS	2x Rear Video in / 2x Rear Video With SVHS	No Rear Video Inputs
2121	22p	x	22p	x
2136	x	22p	22p	x
3121	75R	x	75R	x
3122	100R	x	100R	x
3137	x	75R	75R	x
3138	x	100R	100R	x

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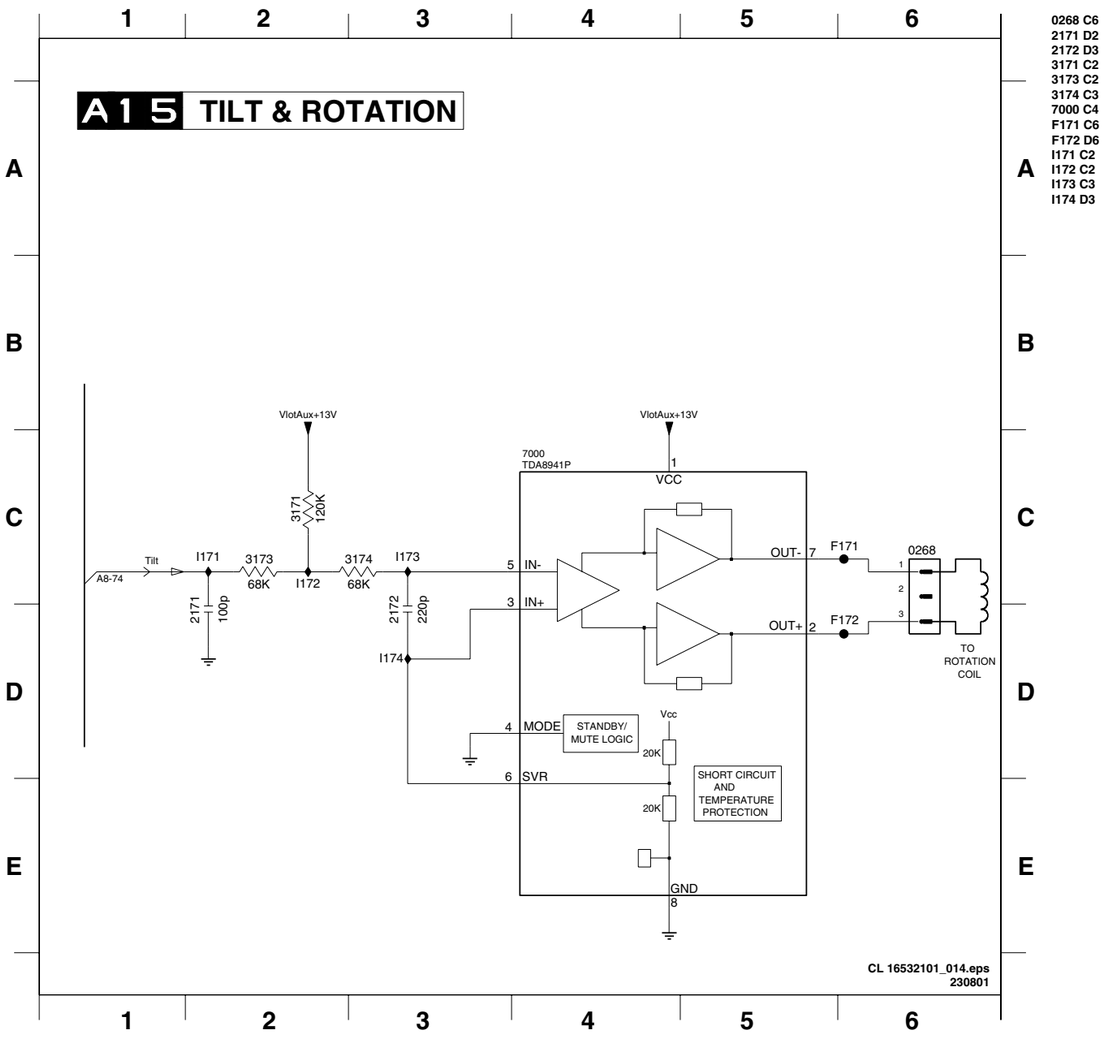
010302

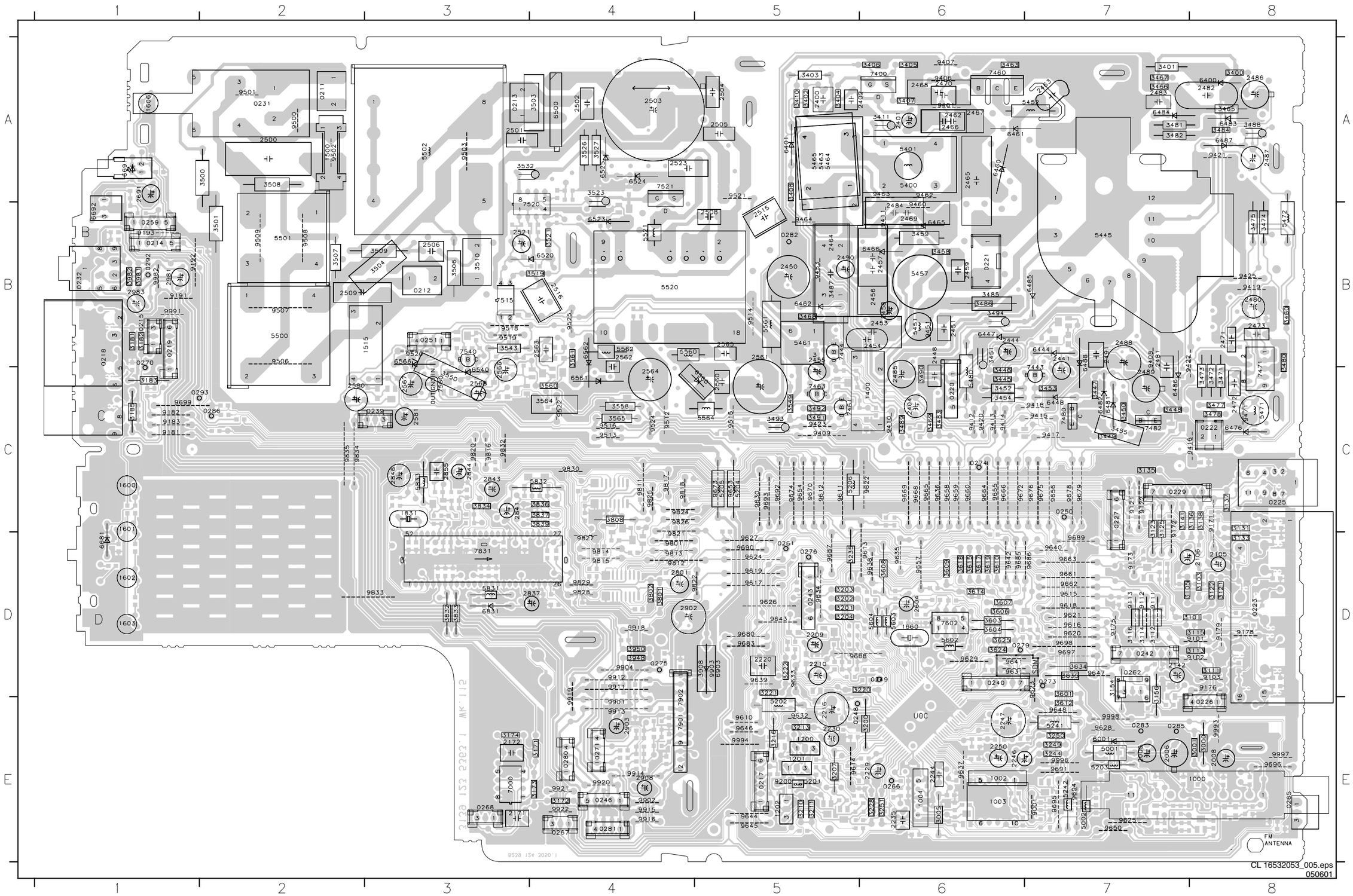
0223-A B10
0223-B F3
0223-C C3
0223-D B3
0225-A D10
0225-B D10
0226 E3
0227 A7
0229 F8
0242 E5
0262 H5
0305 E4
1101 B4
1102 B4
1103 C4
1104 C4
1105 D4
1106 D4
1107 F3
1108 G3
1109 G3
1110 B9
1111 B9
1112 C9
1113 D9
1114 D9
1115 G9
2101 A6
2102 B5
2103 B5
2104 C5
2105 B6
2106 C6
2107 B4
2108 C4
2111 C5
2112 D5
2113 D5
2121 F4
2122 G4
2123 G5
2124 G4
2125 G5
2127 G4
2128 G4
2131 B8
2132 B7
2133 C8
2134 C7
2135 D8
2136 D8
2137 B9
2138 C9
2141 G8
2142 E2
2143 E2
2150 F2
3101 A5
3102 B5
3103 B5
3104 B5
3105 C5
3106 C5
3111 C4
3112 C5
3113 D4
3114 D5
3115 D4
3116 D5
3121 F4
3122 F4
3123 G4
3124 G5
3125 G4
3126 G5
3131 B9
3132 B8
3133 C9
3134 C8
3135 D8
3136 D8
3137 D8
3138 D8
3141 G8
3149 F2
3150 F1
3151 C6
3152 D6
3153 D6
3154 E2
3156 D2
3157 F2
3158 E3
3159 E2
4101 C3
4102 C4
4104 C3
4121 E7
4131 C9
6150 F1
7101 A6
7102 E3
7103 E2
9101 D4
9102 D4
9103 C4
9111 C5
9112 D5
9113 D5
9121 E7
9122 E7
F101 A4
F102 B4
F103 C4
F104 C4
F105 D4
F106 D4
F107 F3
F108 G3
F109 G3
F110 B9
F111 C9
F112 D9
F113 D9
F114 G9
F115 B8
F116 H4
F117 E6
I101 B6
I102 B6
I103 C6
I104 C6
I105 D6
I106 D6
I107 E5
I108 E5
I109 E5
I110 F5
I111 G5
I112 G5
I113 B8
I114 C8
I115 D7
I116 D7
I117 G8
I118 D2
I119 E2
I120 E2
I121 E1

Large Signal Panel: Tilt and Rotation



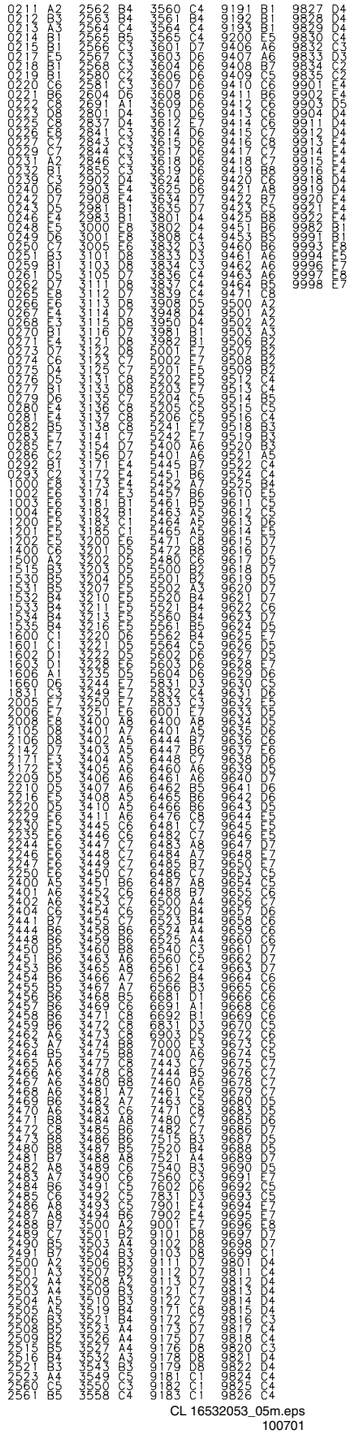
Personal Notes:

Layout Large Signal Panel (Top View)



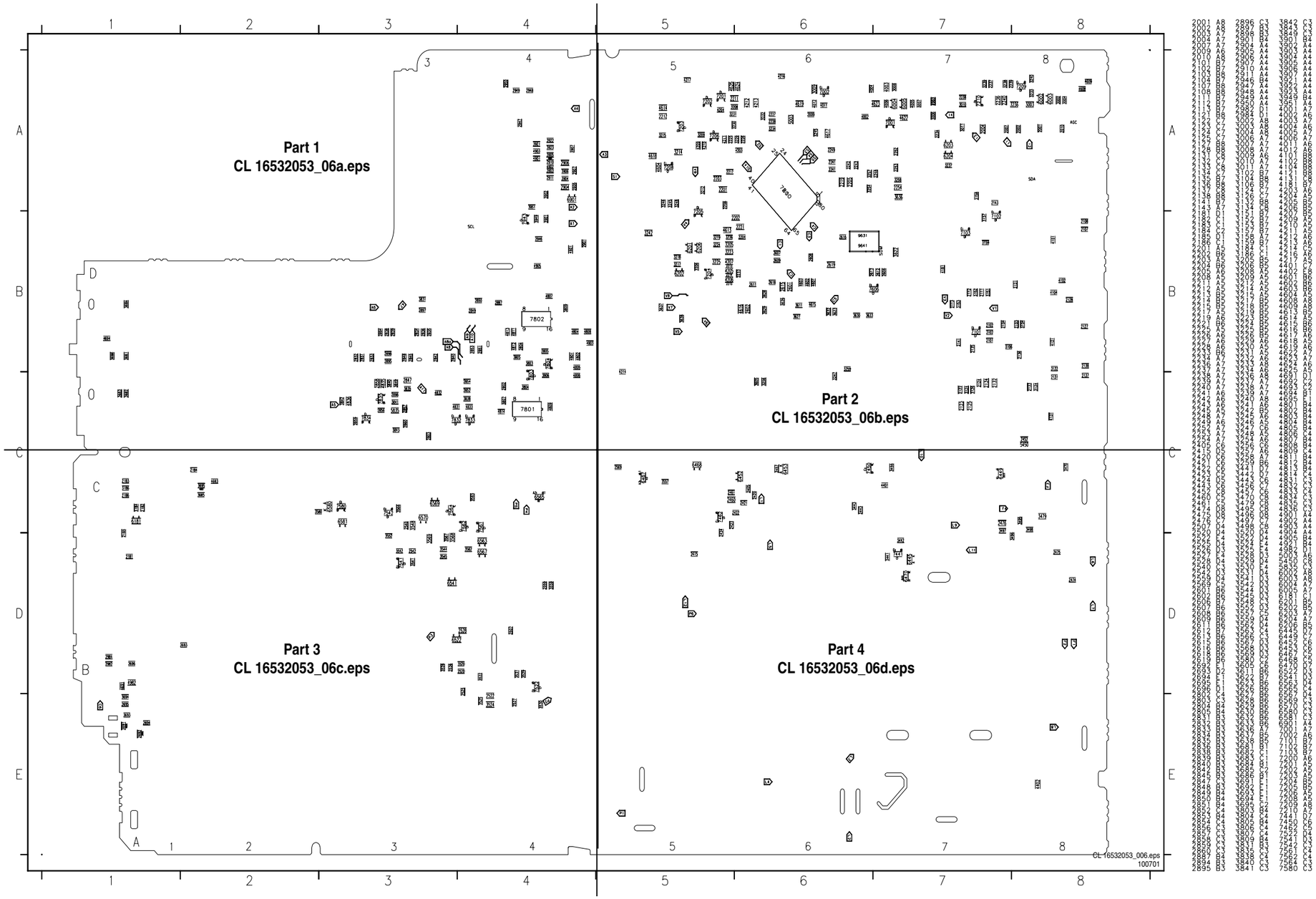
CL 16532053_005.eps
050601

Layout Large Signal Panel (Mapping Top View)



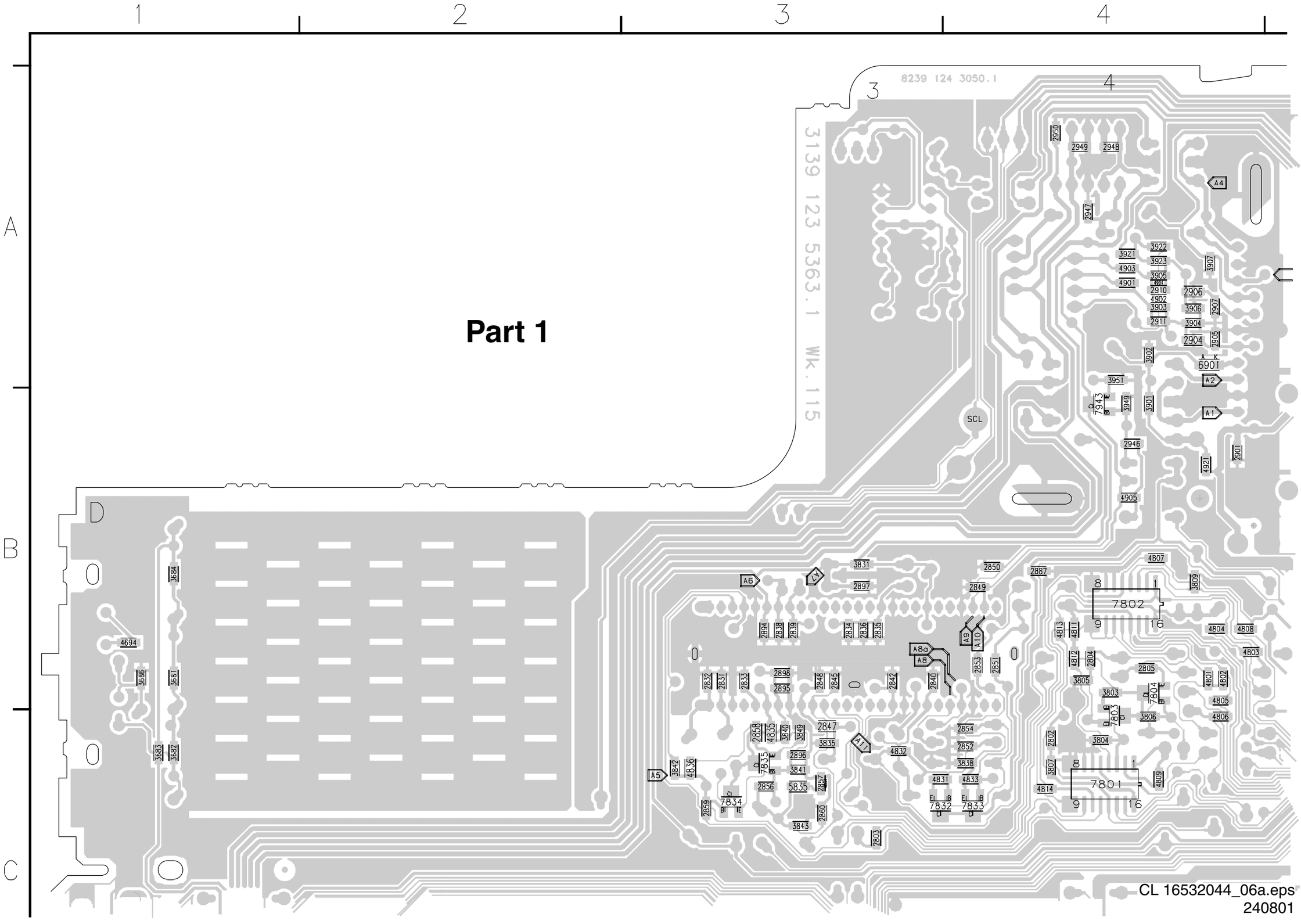
CL 16532053_05m.eps
100701

Layout Large Signal Panel (Overview Bottom View)



Layout Large Signal Panel (Part 1 Bottom View)

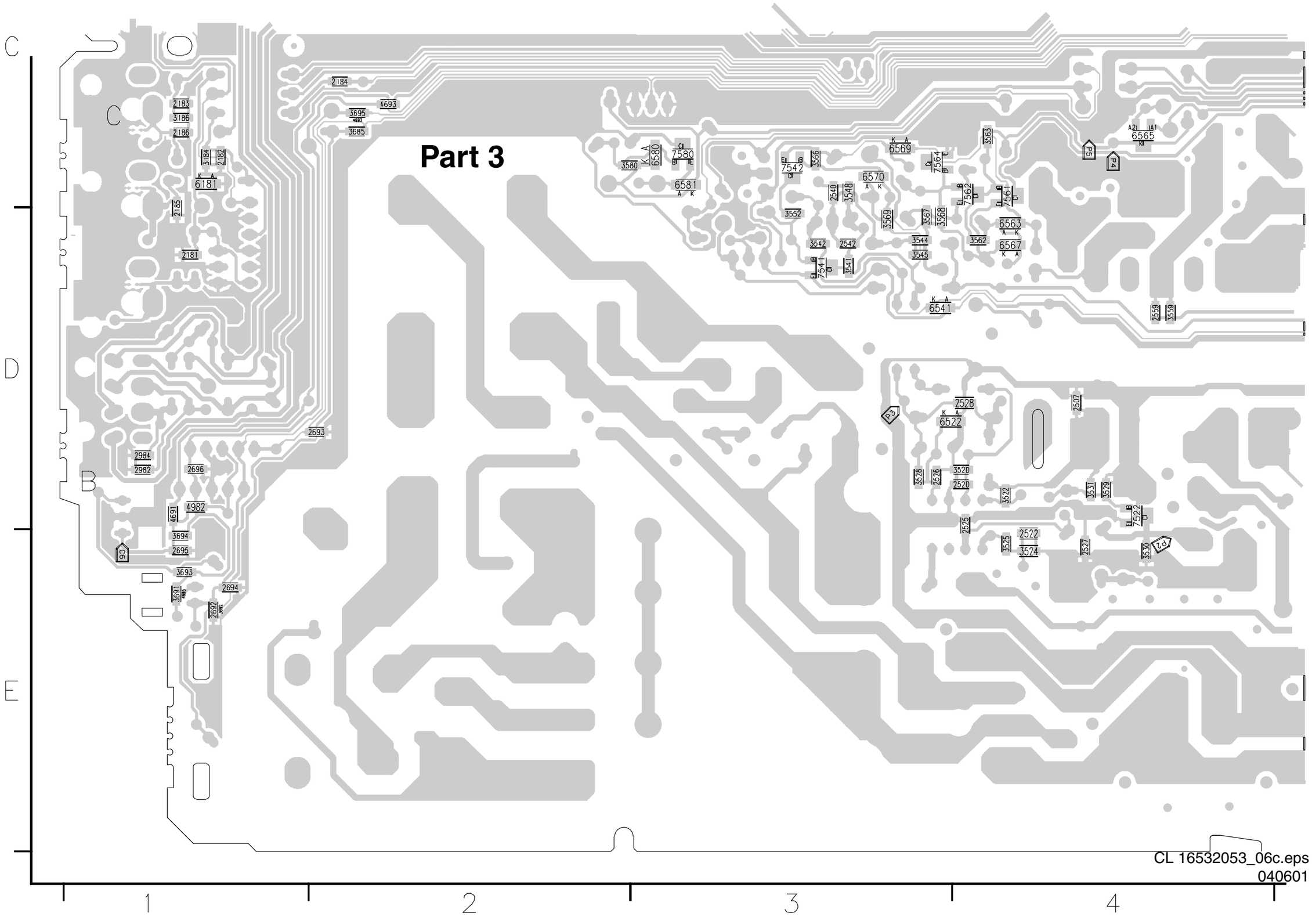
Part 1



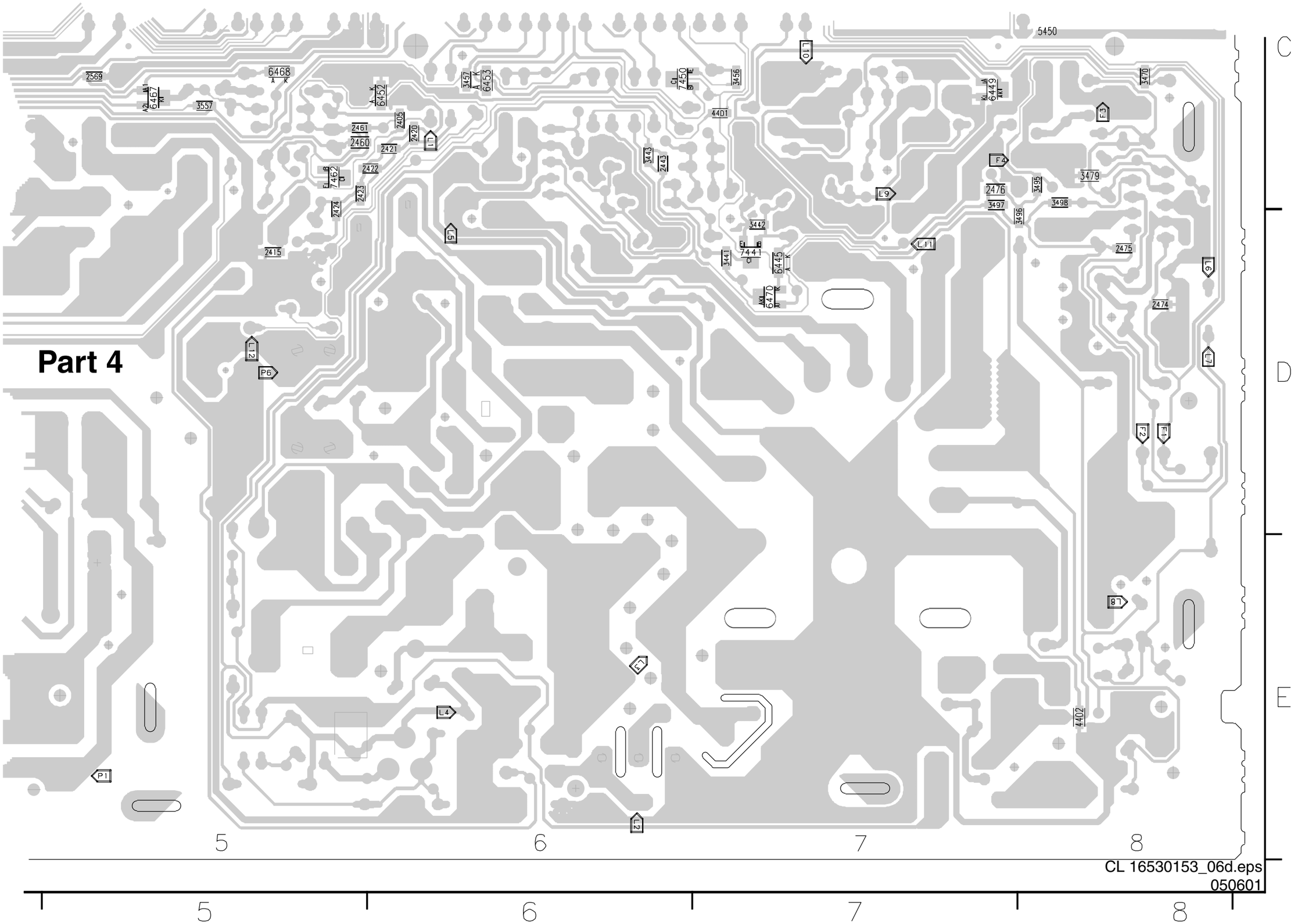
CL 16532044_06a.eps
240801

Layout Large Signal Panel (Part 2 Bottom View)

Layout Large Signal Panel (Part 3 Bottom View)



Layout Large Signal Panel (Part 4 Bottom View)



CL 16530153_06d.eps
050601

CRT Panel

B1 CRT PANEL

V11 1V / div DC 10us / div
V12 1V / div DC 10us / div
V13 1V / div DC 10us / div
V14 50V / div DC 10us / div
V15 50V / div DC 10us / div
V16 50V / div DC 10us / div

+200VA
9341 5343 RES 3347 0R 3348 RES 3349 RES F311 V11
9342 5344 RES 3350 0R 3351 RES 3352 RES V12 F310
9343 5345 RES 3353 0R 3354 RES 3355 RES F312 V13
7330 TDA6107Q 97V 6 2330 100n
Vdd 188k7 IN1 3k77 3k75 Vref A1 BC1 OUT1 2V6 I302 113V 3333 100R
IN2 3k77 A2 BC2 OUT2 I301 115V 3335 100R
IN3 3k77 A3 BC3 OUT3 I303 112V 3331 100R
Vref 2.5V THERMAL PROTECTION BCI 7V F303 6V 2342 1n
GND 4 0V I312 2344 100n 6332 BAS216
BC_INFO
6333 BAV21 6335 BAV21 6331 BAV21 I305 I306 I304
3334 1K F300 V15
3336 1K F301 V14
3332 1K F302 V16
5342 * F308 F309
2345 1n
3345 V
I313

CRT Sockets
0255 0256-A 0254-A
G R B
G1 CG G2 CR H1 H2 CB GND G3

0165 AQUADAG WIRE
T0 CRT SOCKET
Blue Green Red
CRT
NOT USED
T0 CRT SOCKET

0245 R G B
TO 0243 OF A5
B2-67 B2-68 B2-69
FROM RGB PROCESSING
F313 GNDSS

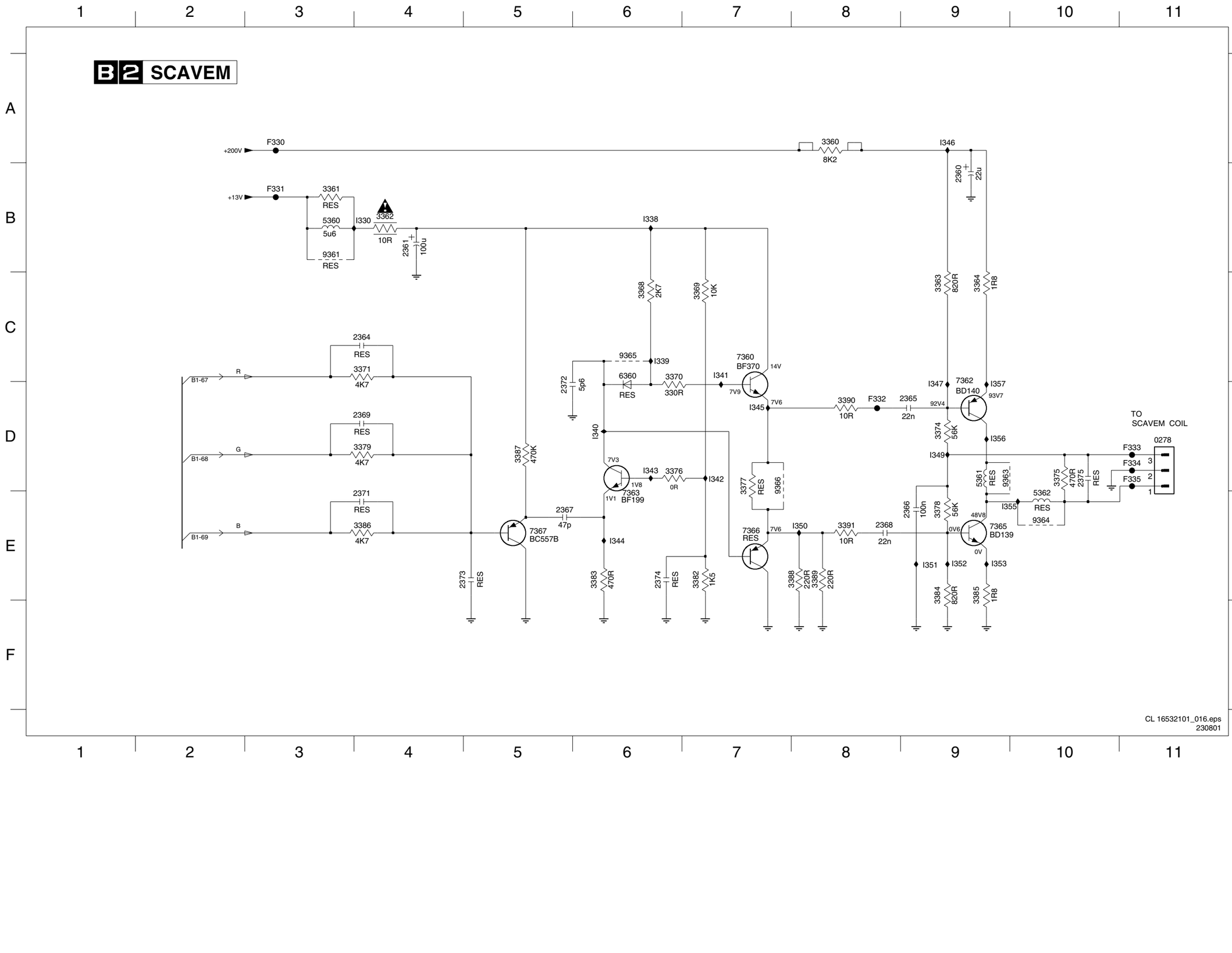
0244
TO 0220 OF A2
EHT_INFO
I311 +200V
+13V
GNDLS
FF
FROM LINE DEFLECTION
3340 10R I309 +200VA 2340 10u
3341 * 3342 * F304 F306
2341 3n3
3343 1K5 I310
2346 680p 2343 3n3
3344 22R I307 I308 3346 22R
VG2 FOCUS EHT
FROM LOT, MAIN CHASSIS A2

ITEM	REGION TUBE												
	AP PH NO EW 32"	AP/CH PH EW 29SF CH	AP/CH PH EW 25"	AP PH EW 29" FSQ	AP/CH SGMK EW 29" RF	AP/CH SMGK EW 25" RF CH	AP/CH SMGK EW 25" RF	AP/CHINA BMCC EW 21" RF CHINA	AP SMGK EW 29RF AP	AP/CH MATJ EW 21RF	THAI PH EW 29FS	CH PH EW 29N	AU SMGK EW 29RF
3341	1R	1R	1R	1R	1R	1R	1R	1K5	1R	1K5	1R	1R	1R
3342	1R	1R	1R	1R	1R	1R	1R	---	1R	---	1R	1R	1R
5342	22u	22u	22u	22u	3u9	15u	15u	100MHZ 50R	3u9	100MHZ 50R	22u	22MUH	3u9

CL 16532101_015.eps 230801

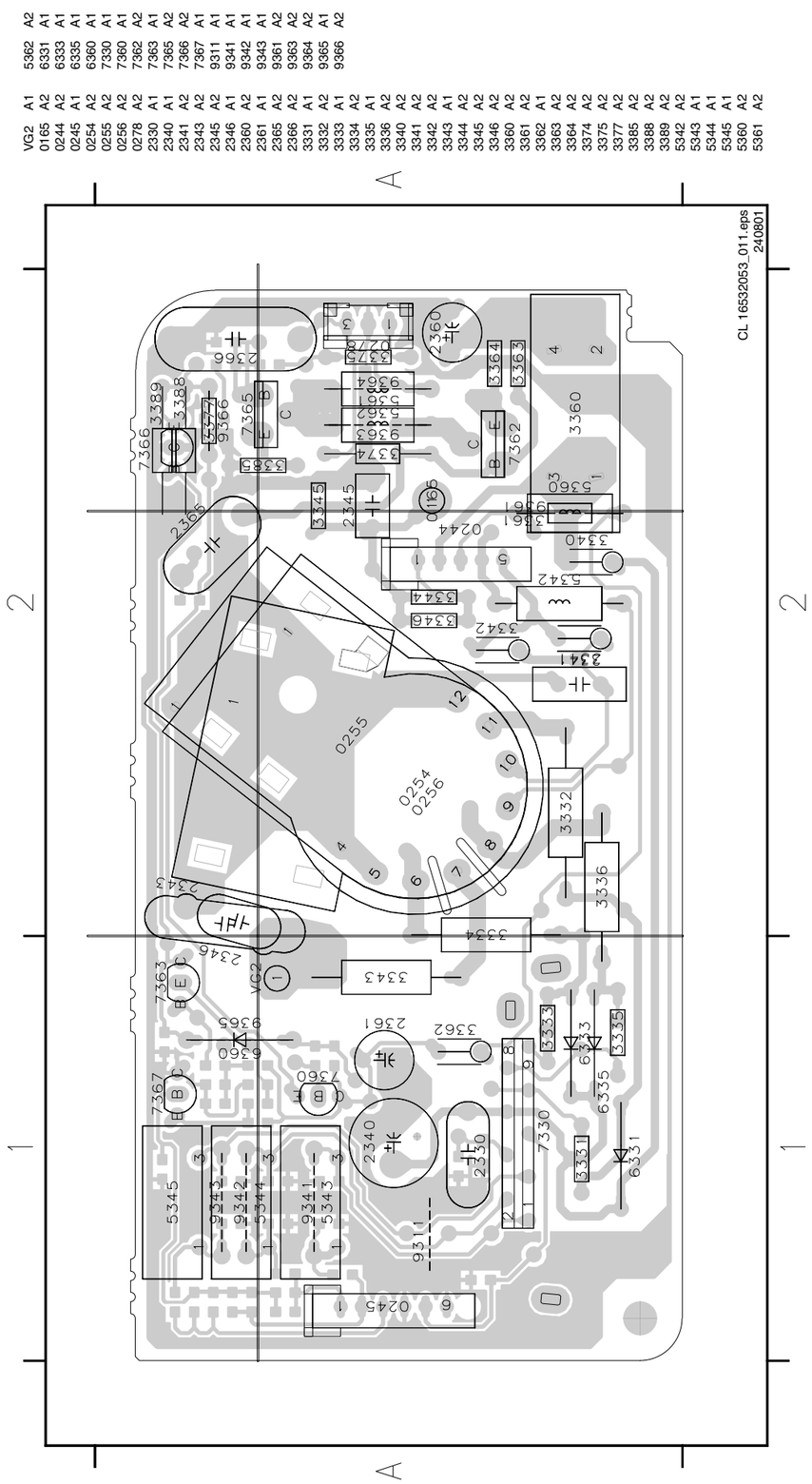
VG2 F10
0165 A8
0244 E2
0245 D2
0254-A B7
0255 B7
0256-A B7
2330 B4
2340 F3
2341 F5
2342 D5
2343 F6
2344 D3
2345 D7
2346 F6
3331 C5
3332 C5
3333 B5
3334 B5
3335 C5
3336 B5
3340 F3
3341 E5
3342 F5
3343 E6
3344 E7
3345 D7
3346 E7
3347 B2
3348 B2
3349 B3
3350 C2
3351 C2
3352 C3
3353 D2
3354 D2
3355 D3
5342 C6
5343 B2
5344 C2
5345 D2
6331 B5
6332 D3
6333 B5
6335 B5
7330 B3
9341 B3
9342 B3
9343 C3
F300 B6
F301 B6
F302 C6
F303 C4
F304 E4
F306 E5
F308 C6
F309 C6
F310 C3
F311 B3
F312 D3
F313 D2
I301 C4
I302 B4
I303 C4
I304 C5
I305 B5
I306 C5
I307 E7
I308 E7
I309 F3
I310 E6
I311 E2
I312 D3
I313 D6

CRT Panel: SCAVEM

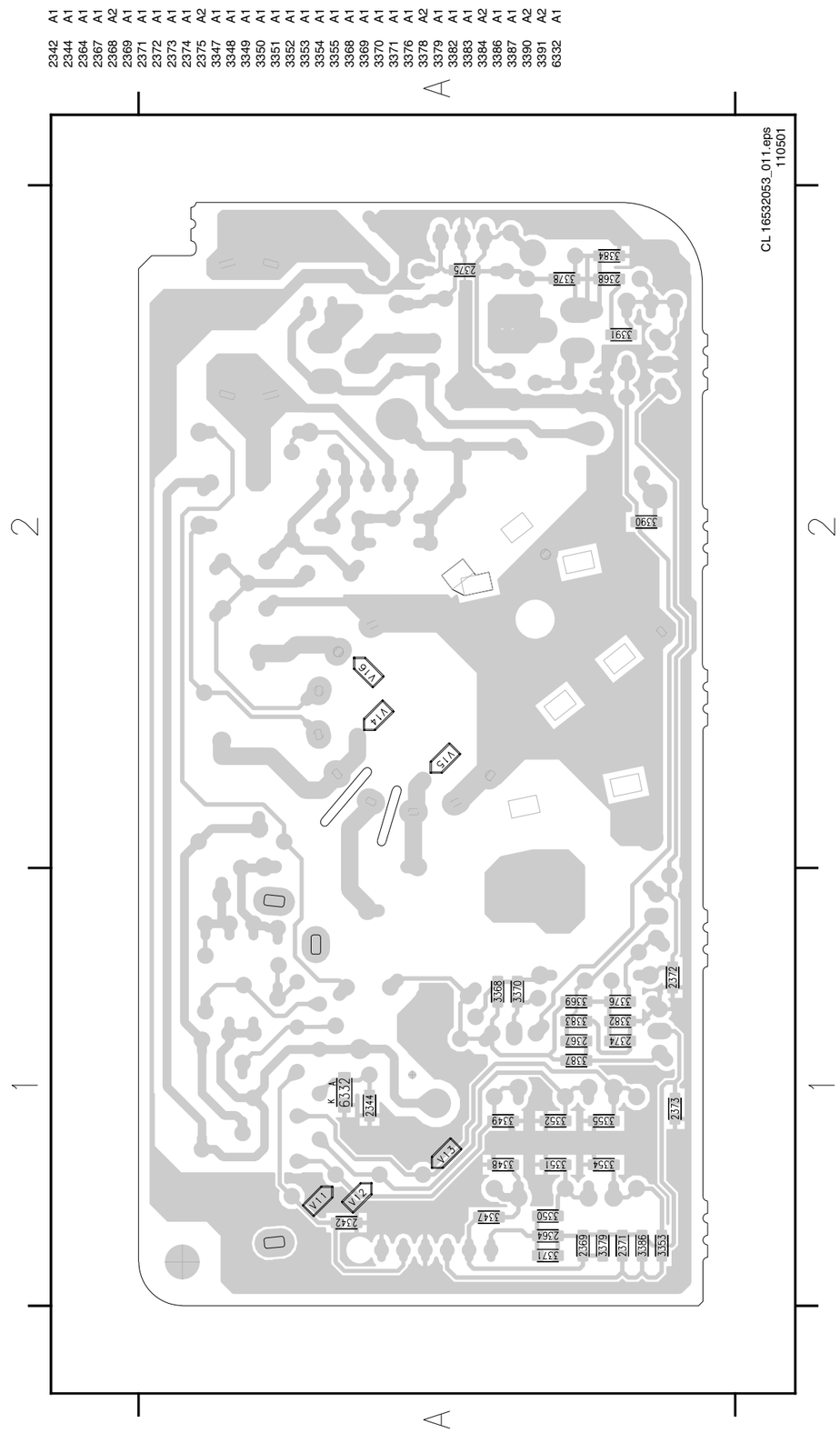


0278 D11
2360 B9
2361 B4
2364 C4
2365 D9
2366 E9
2367 E5
2368 E8
2369 D4
2371 E4
2372 C5
2373 E5
2374 E6
2375 D10
3360 A8
3361 B3
3362 B4
3363 C9
3364 C9
3368 C6
3369 C7
3370 C6
3371 C4
3374 D9
3375 D10
3376 D6
3377 D7
3378 E9
3379 D4
3382 E7
3383 E6
3384 E9
3385 E9
3386 E4
3387 D5
3388 E8
3389 E8
3390 D8
3391 E8
5360 B3
5361 D9
5362 E10
6360 C6
7360 D7
7362 D9
7363 E6
7365 E9
7366 E7
7367 E5
9361 B3
9363 D9
9364 E10
9365 C6
9366 D7
F330 A3
F331 B3
F332 D8
F333 D11
F334 D11
F335 D11
I330 B4
I338 B6
I339 C6
I340 D6
I341 C7
I342 D7
I343 D6
I344 E6
I345 D7
I346 A8
I347 D9
I349 E9
I350 E7
I351 E9
I352 E9
I353 E9
I355 E10
I356 D9
I357 D9

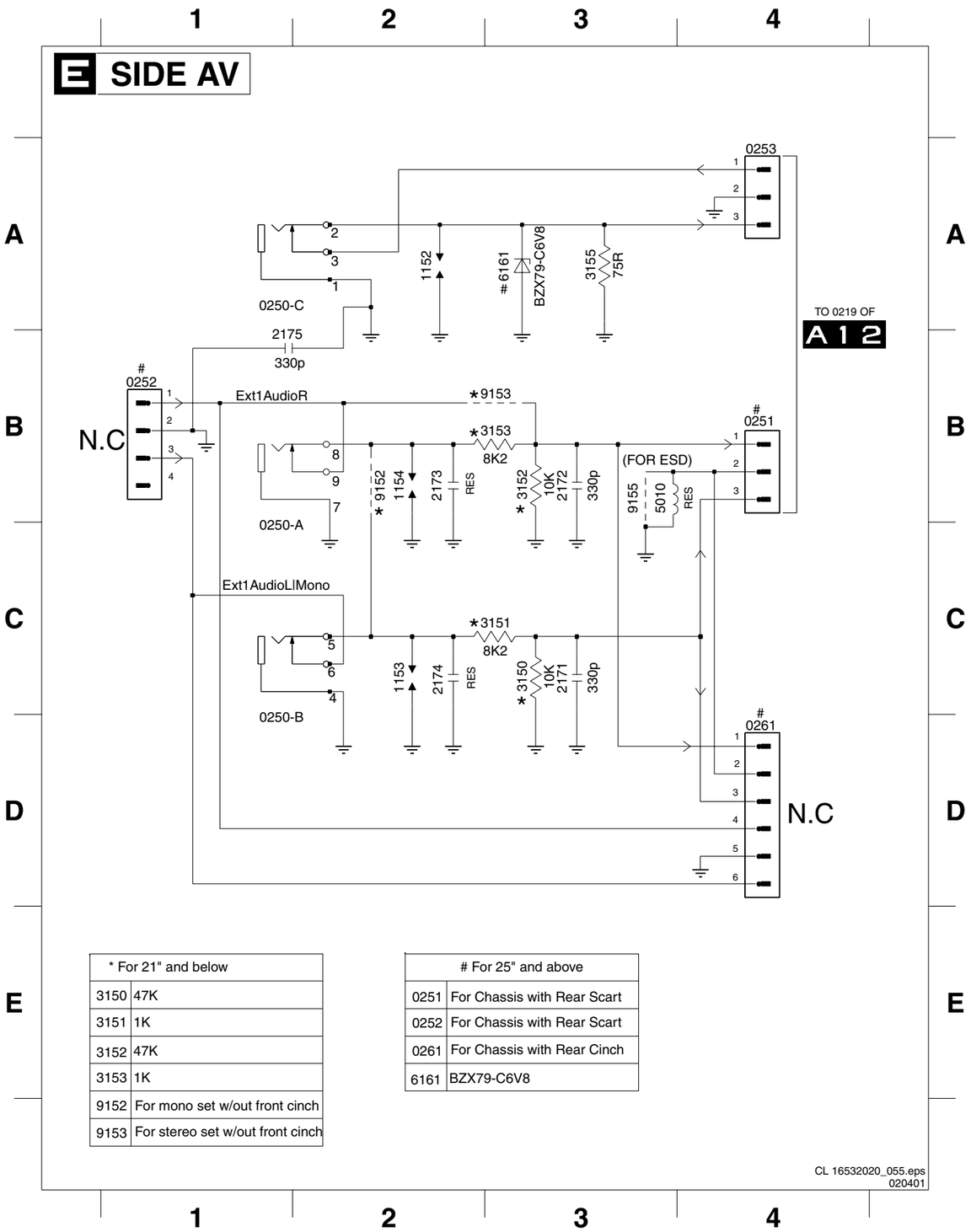
Layout CRT Panel (Top View)



Layout CRT Panel (Bottom View)



Side AV Panel

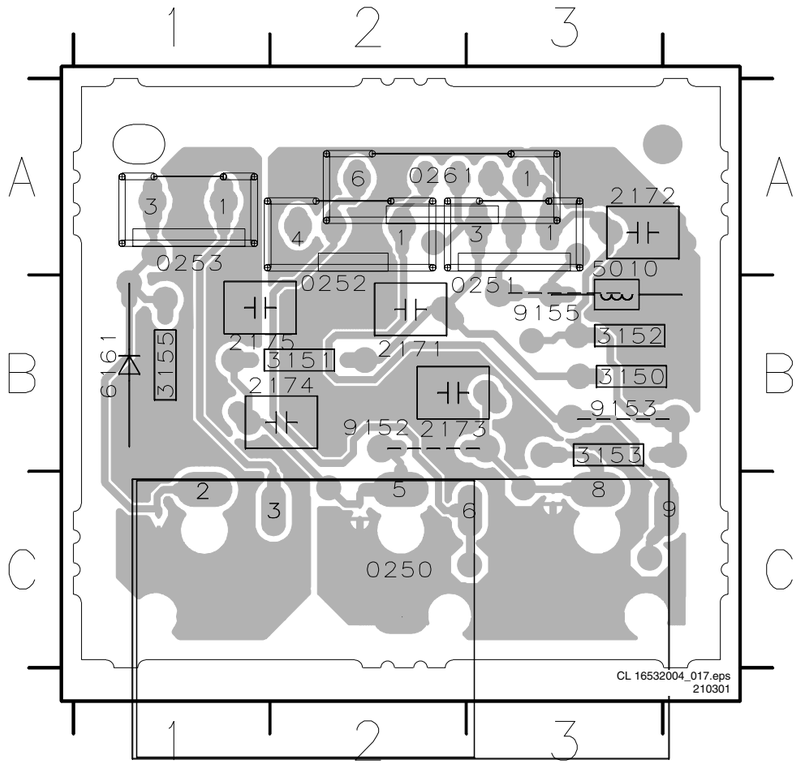


* For 21" and below	
3150	47K
3151	1K
3152	47K
3153	1K
9152	For mono set w/out front cinch
9153	For stereo set w/out front cinch

# For 25" and above	
0251	For Chassis with Rear Scart
0252	For Chassis with Rear Scart
0261	For Chassis with Rear Cinch
6161	BZX79-C6V8

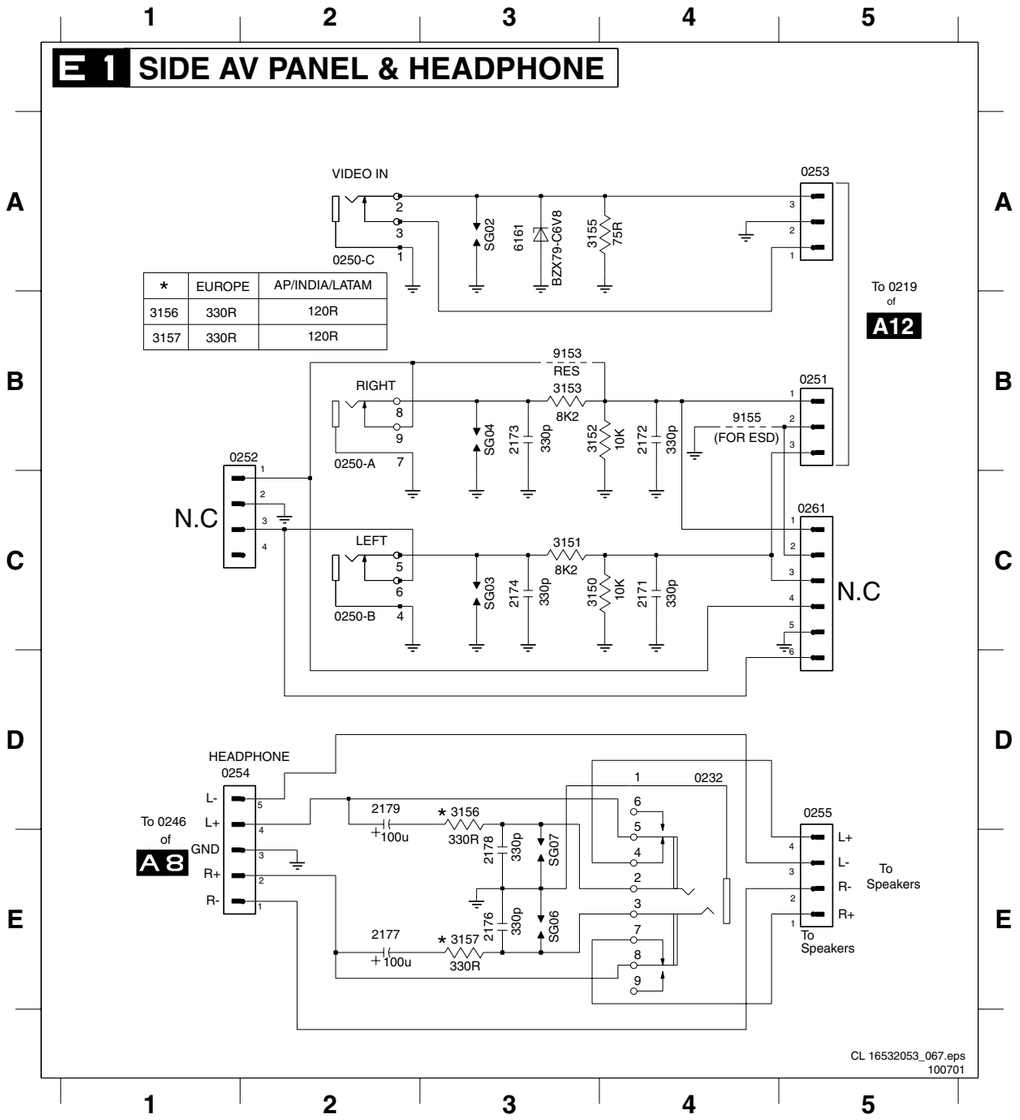
0250-A B1
0250-B C1
0250-C A1
0251 B4
0252 B1
0253 A4
0261 D4
1152 A2
1153 C2
1154 B2
2171 C3
2172 B3
2173 B2
2174 C2
2175 B1
3150 C3
3151 C3
3152 B3
3153 B3
3155 A3
5010 B3
6161 A3
9152 B2
9153 B3
9155 B3

Layout Side AV Panel (Top View)



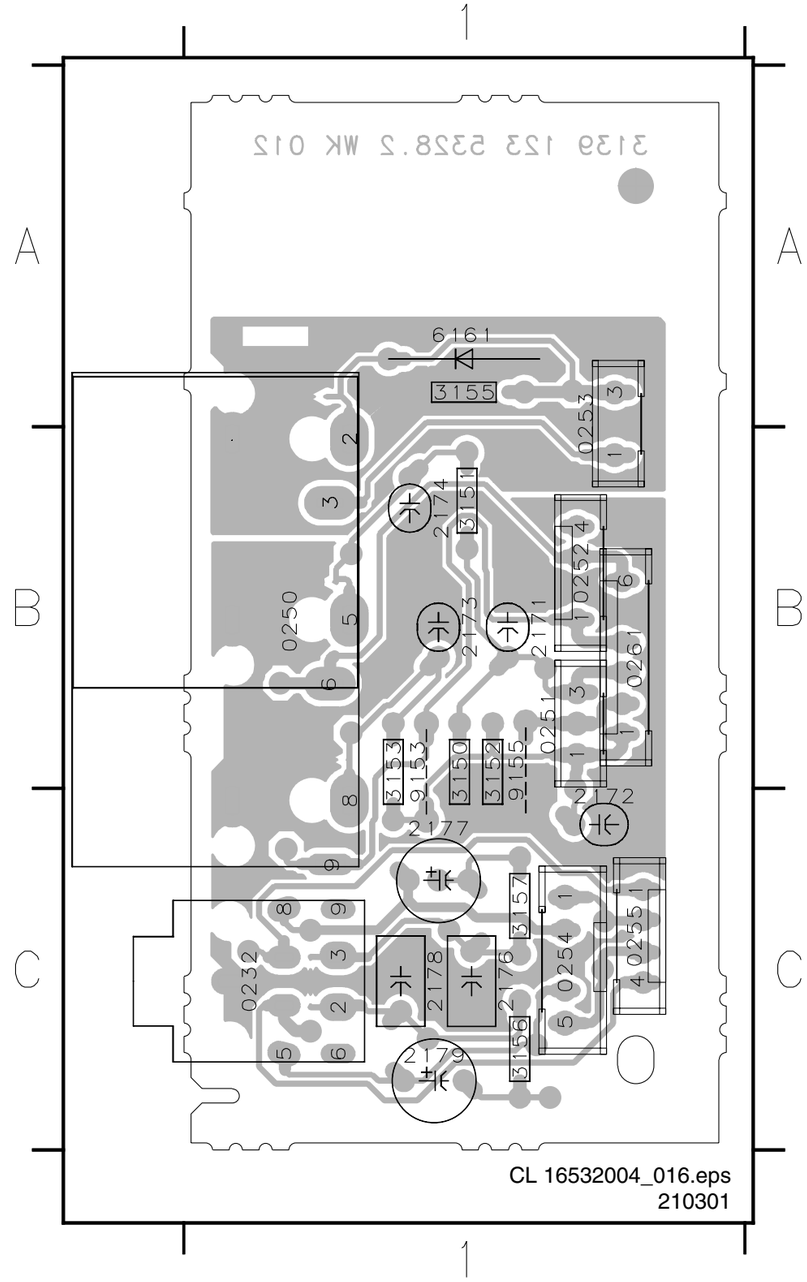
M16	C2
0250	C2
0251	A3
0252	A2
0253	A1
0261	A2
2171	B2
2172	A3
2173	B2
2174	B2
2175	B1
3150	B3
3151	B2
3152	B3
3153	B3
3155	B1
5010	B3
6161	B1
9152	B2
9153	B3
9155	B3

Side AV Panel + Headphone



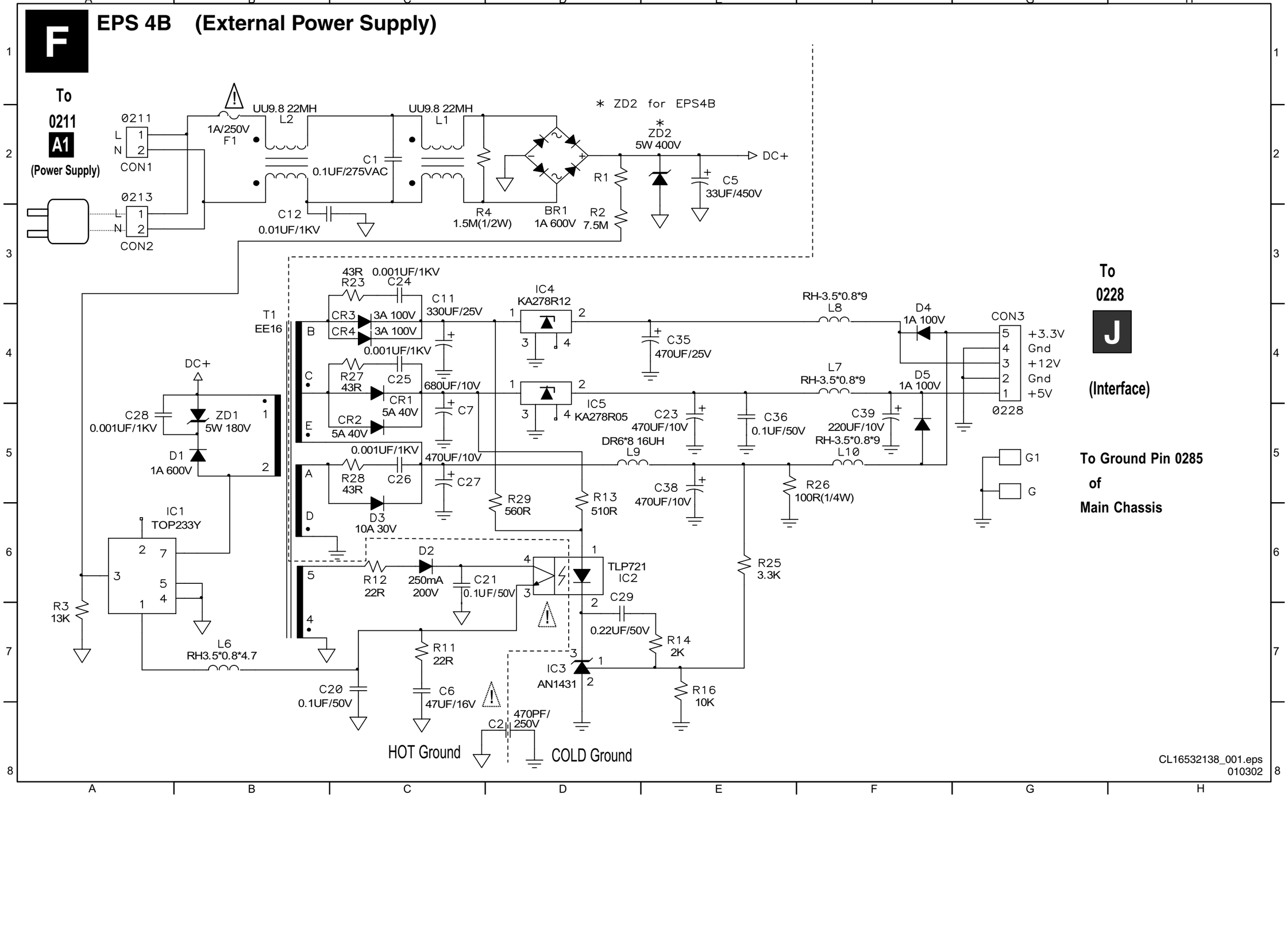
0232 D4
0250-A B2
0250-B C2
0250-C A2
0251 B5
0252 B2
0253 A5
0254 D2
0255 D5
0261 C5
2171 C4
2172 B4
2173 B3
2174 C3
2176 E3
2177 E2
2178 E3
2179 D2
3150 C3
3151 C3
3152 B3
3153 B3
3155 A3
3156 D3
3157 E3
6161 A3
9153 B3
9155 B4
SG02 A3
SG03 C3
SG04 B3
SG06 E3
SG07 E3

Layout Side AV Panel + Headphone (Top View)

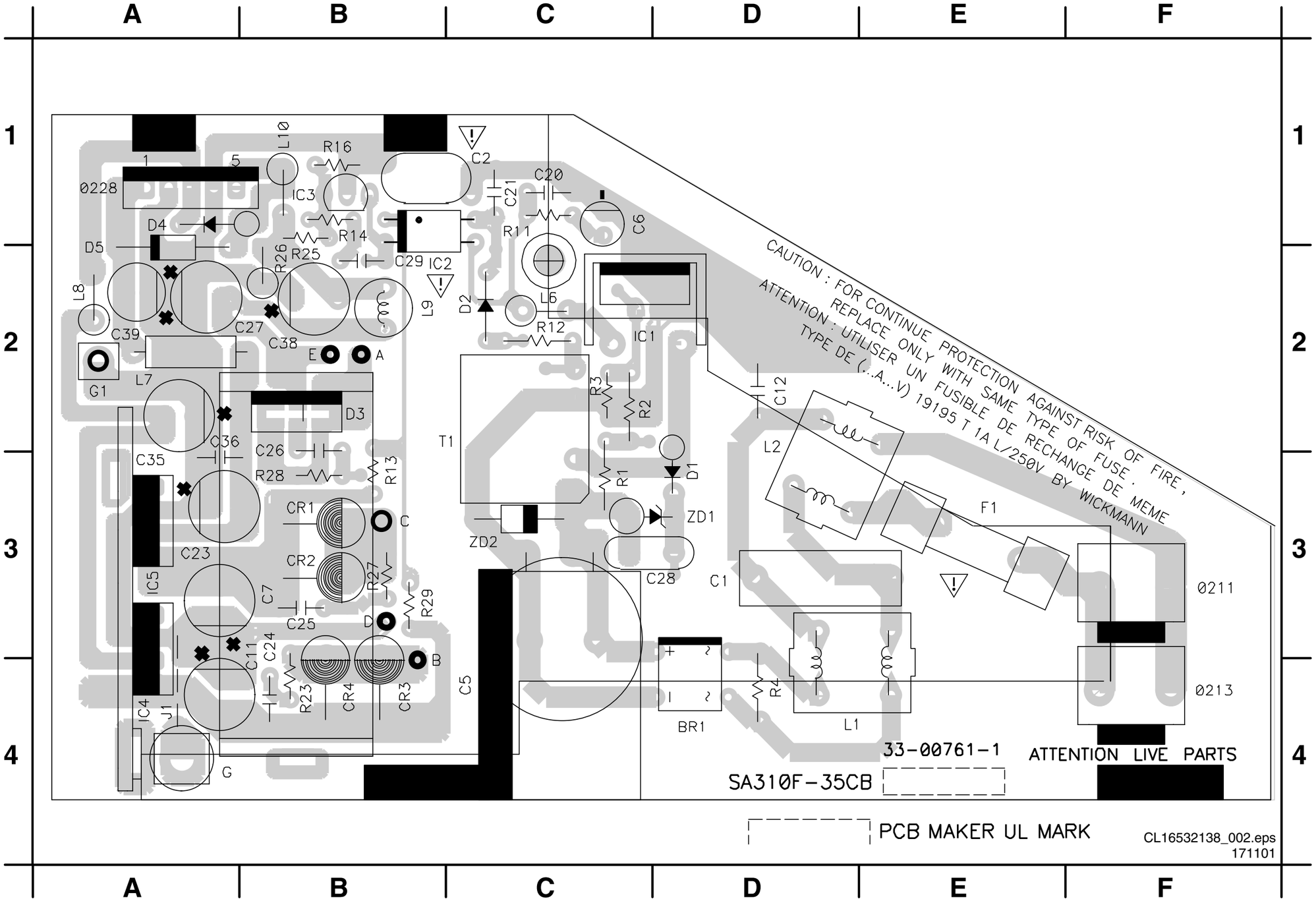


M16 B1
0232 C1
0250 B1
0251 B1
0252 B1
0253 A1
0254 C1
0255 C1
0261 B1
2171 B1
2172 C1
2173 B1
2174 B1
2176 C1
2177 C1
2178 C1
2179 C1
3150 B1
3151 B1
3152 B1
3153 B1
3155 A1
3156 C1
3157 C1
6161 A1
9153 B1
9155 B1

EPS 4B (External Power Supply)



Layout EPS 4B (External Power Supply)



211	F3	R13	B3
213	F4	R14	B1
228	A1	R16	B1
BR1	D4	R23	B4
C1	D3	R25	B2
C2	C1	R26	B2
C5	C4	R27	B3
C6	C1	R28	B3
C7	B3	R29	B3
C11	B3	ZD1	D3
C12	D2	ZD2	C3
C20	C1		
C21	C1		
C23	A3		
C24	B3		
C25	B3		
C26	B2		
C27	B2		
C28	D3		
C29	B2		
C35	A3		
C36	A2		
C38	B2		
C39	A2		
CR1	B3		
CR2	B3		
CR3	B4		
CR4	B4		
D1	D3		
D2	C2		
D3	B2		
D4	A1		
D5	A2		
F1	E3		
G1	A2		
IC1	C2		
IC2	B2		
IC3	B1		
IC4	A4		
IC5	A3		
J1	A4		
L1	D4		
L2	D2		
L6	C2		
L7	A2		
L8	A2		
L9	B2		
L10	B1		
R1	C3		
R2	C2		
R3	C2		
R4	D4		
R11	C1		
R12	C2		
R13	B3		

UIR/LS Module

H UIR/LS MODULE AP

U1
RJ11
1 MSG
2 IR_IN
3 MODE
4 STATUS
5 GND
6 IR_OUT
Clock
Data_in
+5V
Data_out
Gnd
IR_data

R5 2K7
R6 100R
R7 100R
R8 1K0
R9 470R
D3 D4 D5 C6V8 x 3
D6 C6V8
D7 C6V8
C2 100n
C3 100n
U3 HEF4053
Vdd 16
12 MSG
13 CLK
2 IR_IN
1 DATA_IN
5 STATUS
3 DATA_OUT
8 Vss
7 Vee
6 En
14 15 4 11 10 9

R3 10K
R4 10K
Q1 BC847B
R2 10K

D2 1N4148
D1 C5V6
R1 270R
C1 100uF
1251
1 MAIN_AUX
2 GND
3 STDBY
3 P (Black) Ver

T0 0251 OF
A1
POWER SUPPLY

R10 10K
R11 10K
R12 10K
R13 10K
1259
1 DATA_OUT
2 DATA_IN
3 Clock
4 GND
5 IR_OUT
6 STSBY
7 GND
8 +5V
9 DCM_DISABLE
9 P (White) Ver

For /R
T0 0240 OF
A7
CONTROL
For /Y
T0 0240 OF
J
INTERFACE

#Q3 BC847B
#D8 LL4148
#R14 2K7
#R16 680K
R17 10K
Q4 BSN20
IR_IN
IR_OUT
Q2 BC857B
*R15 1K0
#C4 1uF
R33 0 ohm

0259
1 IR_IN
2 +3.3V
3 GND
4 IR_OUT
5 LED
5 P (Yellow) Ver

T0 0259 OF
A12
FRONT CONTROL

R18 100k
Q5 BC857B
R19 100R
R20 47R
D9 C6V8
Q6 BC847B
R21 1K
R22 10K
Q7 BC847B
R23 100K
R25 0R0
R26 10K

0262
3 MSG
2 GND
1 GND
F pin conn for chassis plug in

T0 0262 OF
A13
REAR I/O CINCH

J5
Fishhood
1

D10 LL4148
C5 100n
R24 100k
Q8 BC847B

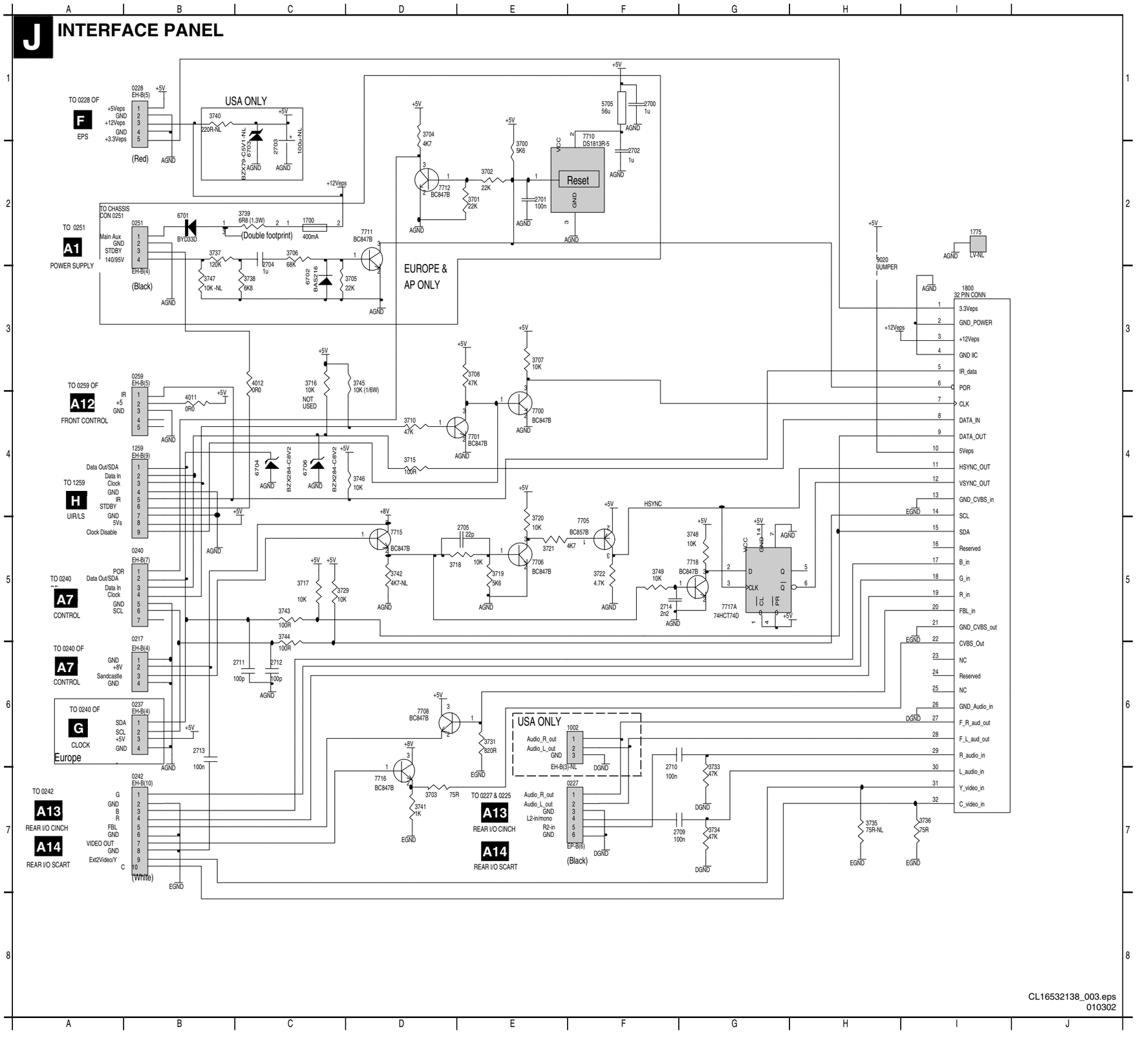
U2
2
4
1
Phone Jack
D11 C22V
D12 C22V
C6 2n2
RT1 RXE 030
1246
1 SPK
2 SPK+
3 P (White) Ver

TO TV SPK

CL 26532029_010.eps
010302

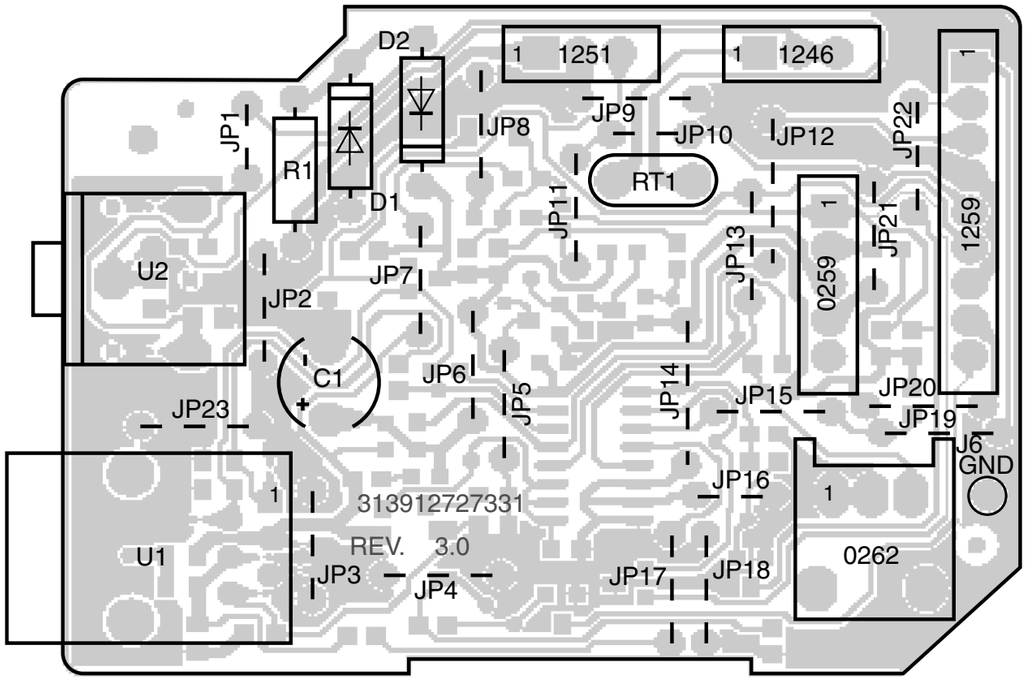
Interface Panel

J INTERFACE PANEL



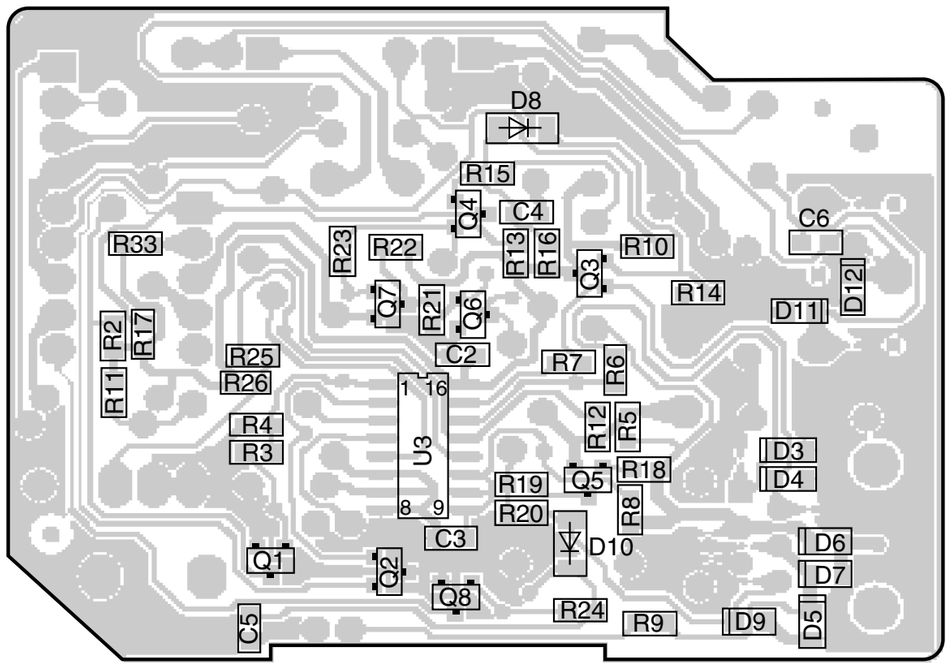
CL16532138_003.eps
010302

Layout UIR/LS Module (Top View)



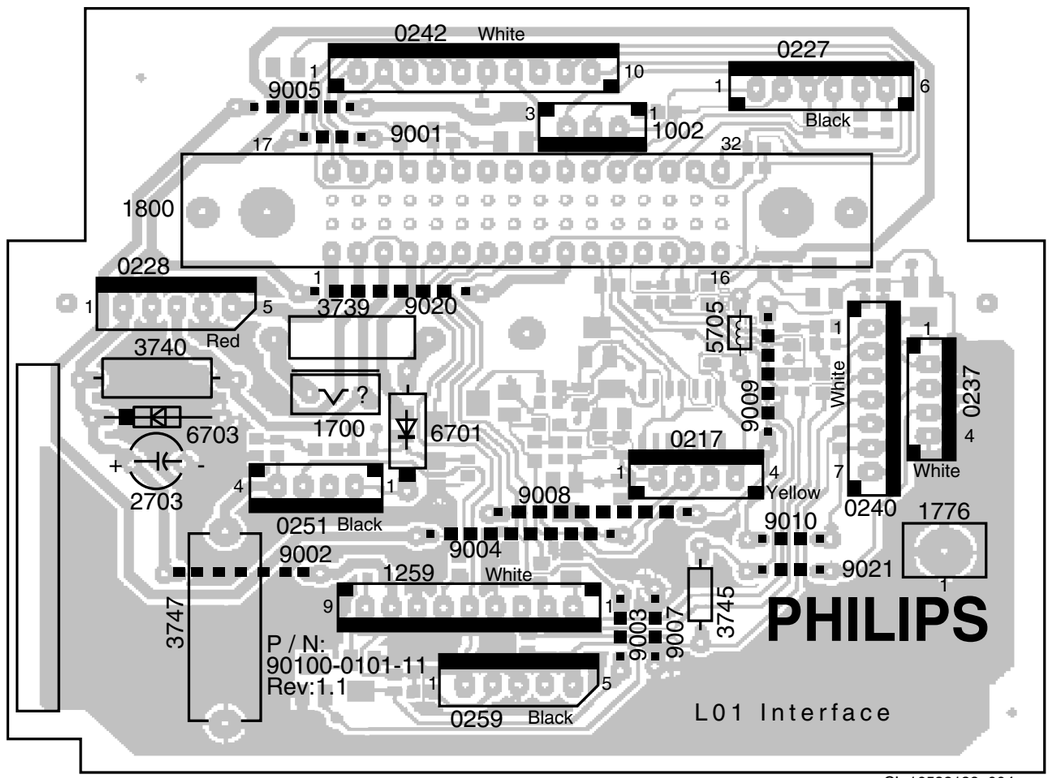
CL 16532138_005.eps
161101

Layout UIR/LS Module (Bottom View)



CL 16532138_006.eps
161101

Layout Interface Panel

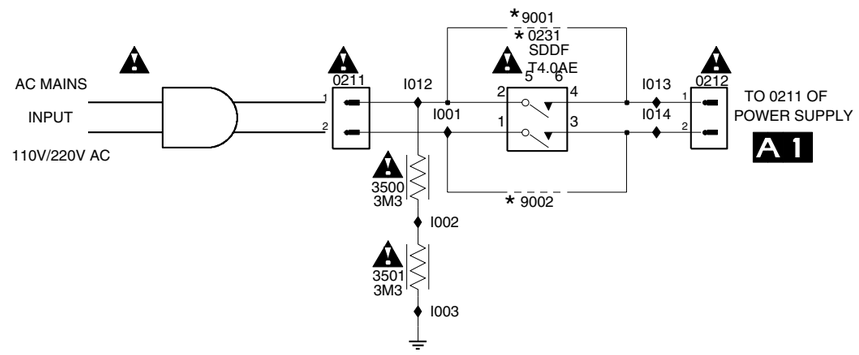


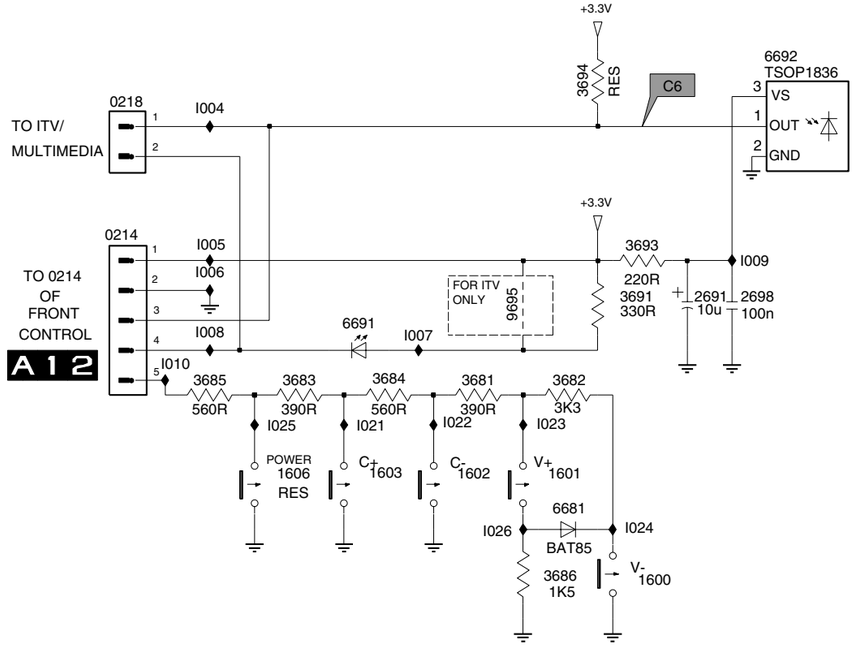
CL 16532138_004.eps
171101

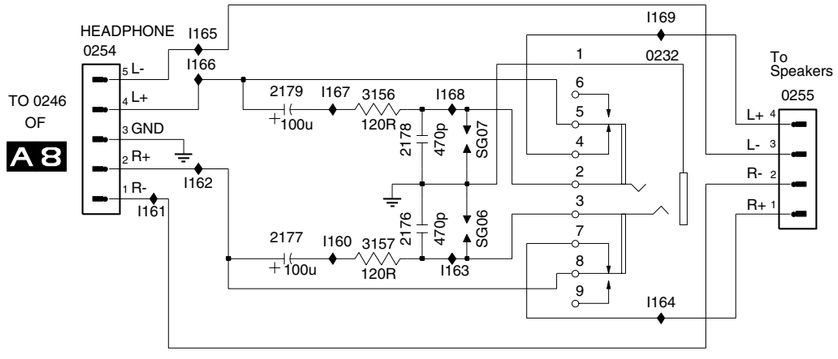
Front Interface & Control Panel

Q FRONT INTERFACE + CONTROL PANEL (AP)

ITEM NO	KEYBOARD IR+LED-GL	KEYBOARD IR+LED-NA	IR+LED-NA	IR+LED EU/AP	FRNT.INTERF AP	TOP CTL + FR.PL INTERF - EU/NA
0231	2P 8/128A SDKV	-	-	2P 8/128A SDKV	-	-
9001	-	YES	YES	-	YES	YES
9002	-	YES	YES	-	YES	YES



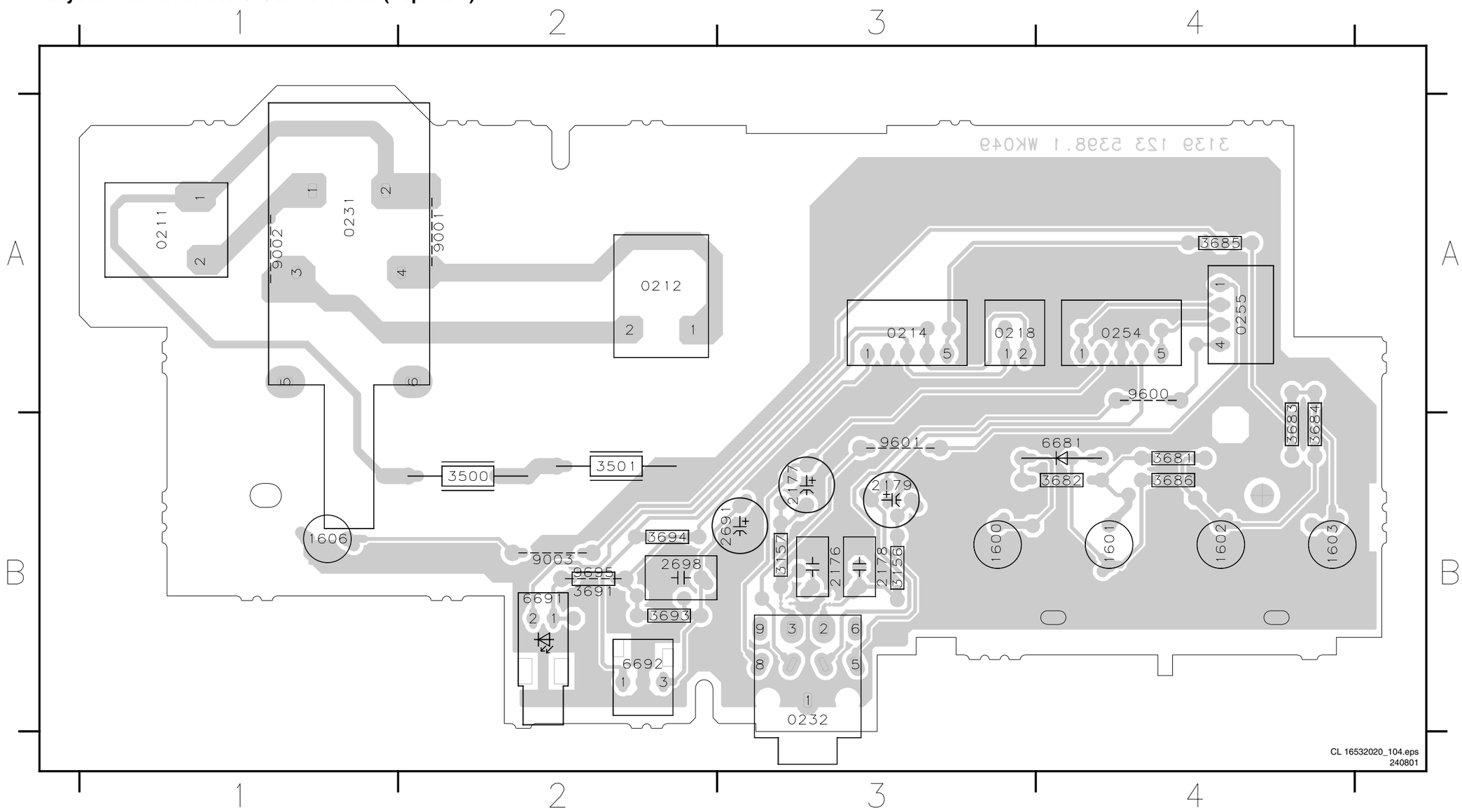




CL 16532101_017.eps
230801

0211 B3
0212 B5
0214 E2
0218 D2
0231 B4
0232 D9
0254 D7
0255 D9
1600 G5
1601 F4
1602 F4
1603 F4
1606 F3
2176 E8
2177 E8
2178 E8
2179 D8
2691 E5
2698 E5
3156 D8
3157 E8
3500 C3
3501 C3
3681 F4
3682 F5
3683 F3
3684 F4
3685 F3
3686 G4
3691 E5
3693 E5
3694 D5
6681 F5
6691 E3
6692 D6
9001 B4
9002 C4
9695 E4
I001 B4
I002 C4
I003 C4
I004 D3
I005 E3
I006 E3
I007 F4
I008 F3
I009 E5
I010 F3
I012 B3
I013 B5
I014 B5
I021 F4
I022 F4
I023 F4
I024 F5
I025 F3
I026 F4
I160 E8
I161 E7
I162 E7
I163 E8
I164 E9
I165 D7
I166 D7
I167 D8
I168 D8
I169 D9
SG06 E8
SG07 E8

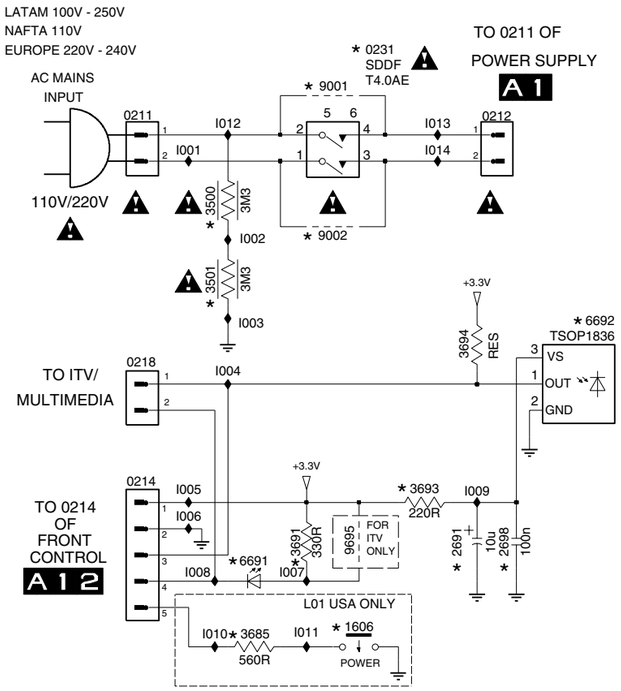
Layout Front Interface & Control Panel (Top View)



0211 A1
0212 A2
0214 A3
0218 A3
0231 A1
0232 B3
0254 A4
0255 A4
1600 B3
1601 B4
1602 B4
1603 B4
1606 B1
2176 B3
2177 B3
2178 B3
2179 B3
2691 B3
2698 B2
3156 B3
3157 B3
3500 B2
3501 B2
3681 B4
3682 B4
3683 B4
3684 B4
3685 A4
3686 B4
3691 B2
3693 B2
3694 B2
6681 B4
6691 B2
6692 B2
9001 A2
9002 A1
9003 B2
9600 A4
9601 B3
9695 B2

Front Interface Panel

Q 1 FRONT INTERFACE PANEL



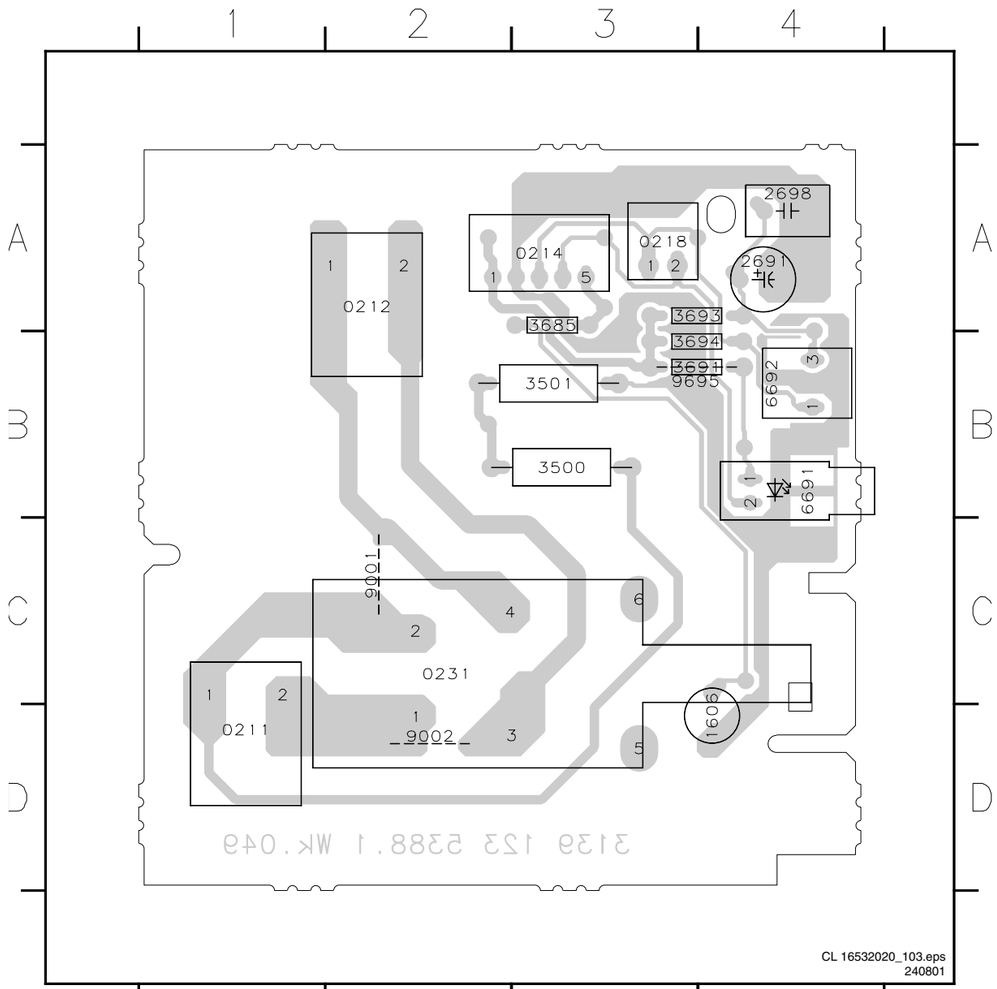
0211 B3
0212 B5
0214 D3
0218 D3
0231 B4
1606 E4
2691 E5
2698 E5
3500 C3
3501 C3
3685 E4
3691 E4
3693 D5
3694 C5
6691 E4
6692 C6
9001 B4
9002 C4
9695 E4
I001 B3
I002 C4
I003 C4
I004 D4
I005 D3
I006 D3
I007 E4
I008 E3
I009 D5
I010 E3
I011 E4
I012 B4
I013 B5
I014 B5

ITEM	KEYBOARD IR+LED-GL	KEYBOARD IR+LED-NA	IR+LED-NA	IR+LED EU/AP	FRNT.INTERF AP	TOP CTL + FR.PL INTERF - EU/NA
0231	2P 8/128A SDKV	-	-	2P 8/128A SDKV	-	-
9001	-	YES	YES	-	YES	YES
9002	-	YES	YES	-	YES	YES

ITEM	FRNT INTERF. - SLIM EU / LA	FRNT INTERF. - SLIM NA	FRNT INTERF. - SLIM EU NON ULL01L
0231	YES	---	YES
1606	---	YES	---
2691	YES	YES	---
2698	YES	YES	---
3500	YES	YES	---
3501	YES	YES	---
3685	---	YES	---
3691	YES	YES	---
3693	YES	YES	---
6691	YES	YES	---
6692	YES	YES	---
9901	---	YES	---
9002	---	YEs	---

CL 16532101_018.eps
230801

Layout Front Interface Panel (Top View)



0211 C1
0212 A2
0214 A3
0218 A3
0231 C3
1606 D4
2691 A4
2698 A4
3500 B3
3501 B3
3685 A3
3691 B3
3693 A3
3694 B3
6691 B4
6692 B4
9001 C2
9002 D2
9695 B3

CL 16532020_103.eps
240801